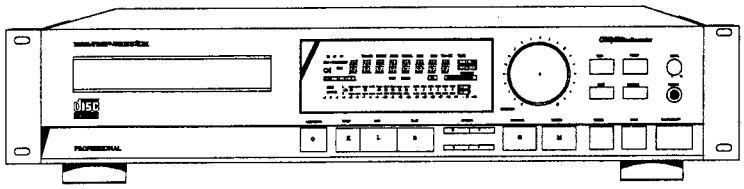
# Service Manual

## 74 CDR620/02B/02M/06B
## 74 CDR615/02B/02M/06B
## Compact Disc Recorder



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Please use this service manual with referring to the user guide (D.F.U) without fail.
修理の際は、必ず取扱説明書を準備し操作方法を確認の上作業を行ってください。

marantz®

# model CDR620/CDR615


Printed in Japan

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### SHOCK, FIRE HAZARD SERVICE TEST :

**CAUTION :** After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins ( with unit NOT connected to AC mains and its Power switch ON ), and the face or Front Panel of product and controls and chassis bottom.

Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before it is return to the user/customer.

Ref. UL Standard N0. 1492.

In case of difficulties, do not hesitate to contact the Technical Department at above mentioned address.

970408KI

## 1.1 WARNINGS AND SAFETY INSTRUCTIONS

**CLASS 1**
**LASER PRODUCT**

**DANGER**
As the laserbeam used in this equipment is harmfull to the eyes do not open the set. Invisible Laser radiation when the set is open.
(Class 3B laser)

**AVOID DIRECT EXPOSURE TO BEAM.**

**WARNING**
Use of controls or adjusments or performance other than those specified herein may result in hazardous radiation exposure.

**WARNING**
The use of optical instruments with this product will increase eye hazard.

**Laser Device Unit** (LT025MD)
Material: Semiconductor
Wave length: 780 nm
Laser Output:
Read: 0.7 - 0.9 mW
Write: 12 - 14 mW

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

CLASS 3B
LASER PRODUCT

**CAUTION** INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
**VARO!** AVATTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASER SÄTEILYLLE ÄLÄ KATSO SÄTEESEN
**VARNING** OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD BETRAKTA EJ STRÅLEN
**ADVERSEL** USYNLIG LASERSTRÅLING VED ÅBNING. UNDGÅ UNSAETTELSE FOR STRÅLING
**DANGER** INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM
**VORSICHT** UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETSEN

## 1.2 INSTRUCTIONS FOR USE

### INTRODUCTION

Since the introduction by Marantz of the first standalone compact disc recorder (CDR) in 1991, the medium has found countless professional applications.
The multi-functional CDR620 sets new standards, with improved features such as state of the art electronics, top quality A/D and D/A converters, sample rate converter, digital audio delay and fully automatic indexing from CD, DAT, DCC and MD sources.
The CDR620 also incorporates an entirely new CD mechanism. Built around current leading edge optical technology the mechanism helps to ensures optimal data security and integrity. This leads to improved quality and reliability while maintaining backwards compatibility with existing application software. In standalone mode, CD-DA titles can be directly recorded via the professional analogue and digital audio interfaces, and the SCSI-II interface allows the recording of large quantities of data (up to 600 Mb) in one of the standard CD-formats: CD-ROM(XA), PHOTO-CD, CD-I, Video-CD and CD-DA. The drive of the CDR620 is able to read and write at double and normal transfer rate as compared to standard CD-ROM and CD-DA drives.
Using two CDR620's it is also possible to duplicate CD-DA/ROM discs via the SCSI-II interface at double speed.
The CDR620 conforms to the standards of Orange Book, Part II, wich means that recorded discs can be read by CD-ROM(XA), CD-I, PHOTO-CD, Video-CD and CD-DA players.

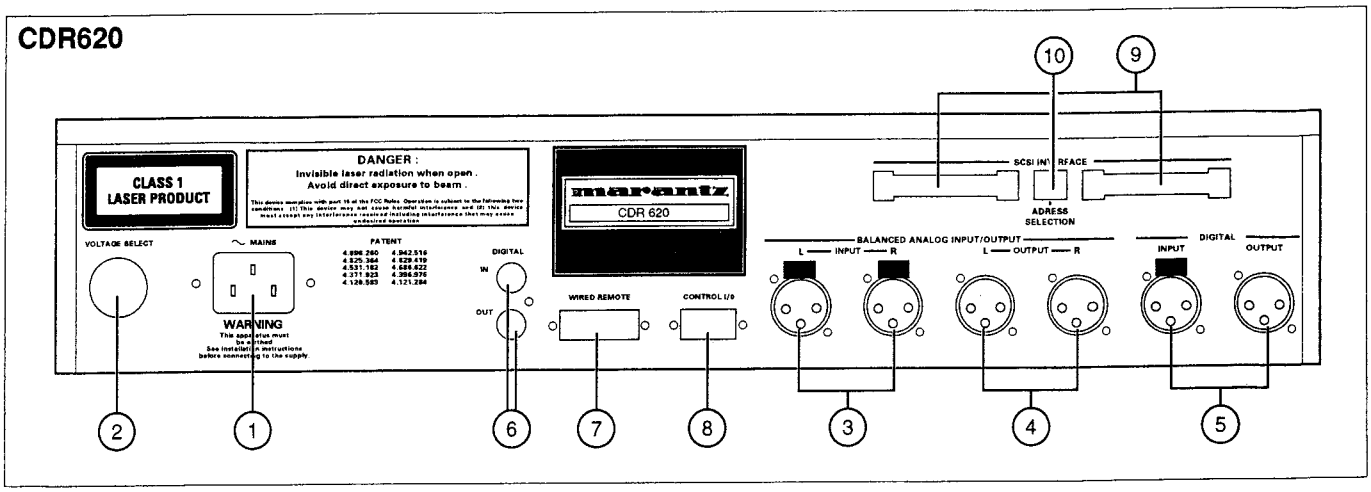
### CDR Blank discs

The CD-R blank discs as a medium are industry standard and availabe from various suppliers.
The CDR620 recording quality depends upon the quality of the blank CDR disc used.
CDR discs are extremely critical media , because:

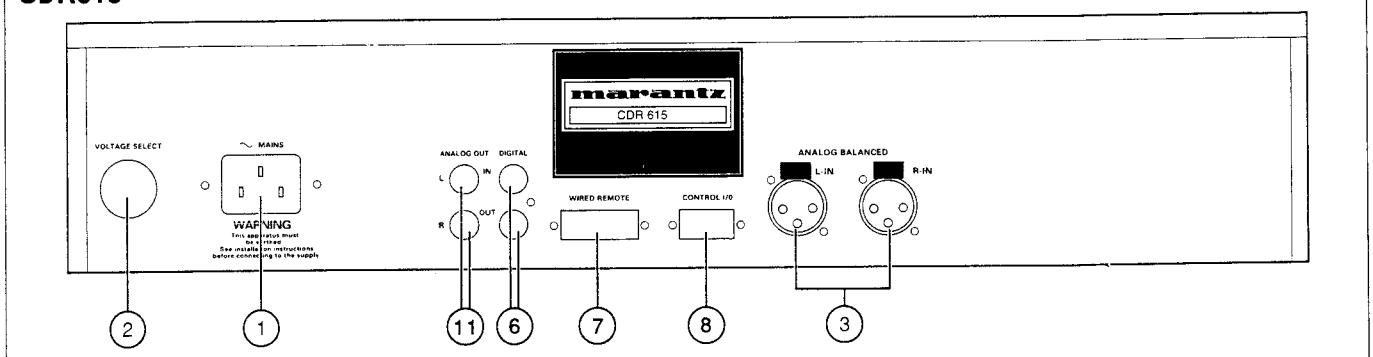
a. CDR is a write-once process
b. CDR recorded discs need to be compatible with the Red Book standard.

Only the best quality discs should be used.
**Marantz CDR** discs ensure the best recording quality on your CDR620 CD recorder.

## CDR620




## CDR615

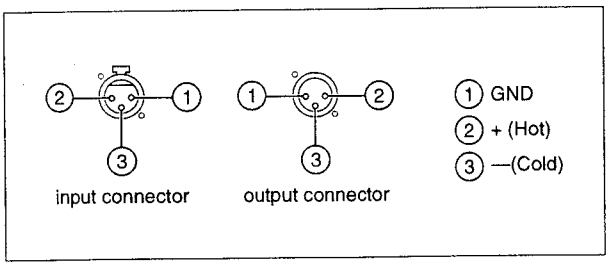



1. **AC MAINS input**
   Connect to the grounded AC outlet with the AC power supply cord included.

2. **AC MAINS VOLTAGE SELECTOR**
   Use this selector to adapt to your local voltage

3. **ANALOGUE IN terminals**
   These are balanced analogue audio XLR input connectors

4. **ANALOGUE OUT terminals (CDR620 ONLY)**
   These are balanced analogue audio XLR output connectors




5. **AES/EBU terminals (IN/OUT) (CDR620 ONLY)**
   These terminals are for input or output of signals for the professional digital audio interface (XLR).

6. **IEC958 type II jacks (IN/OUT)**
   These terminals are for input or output of digital audio signals from/to a digital audio device (cinch).

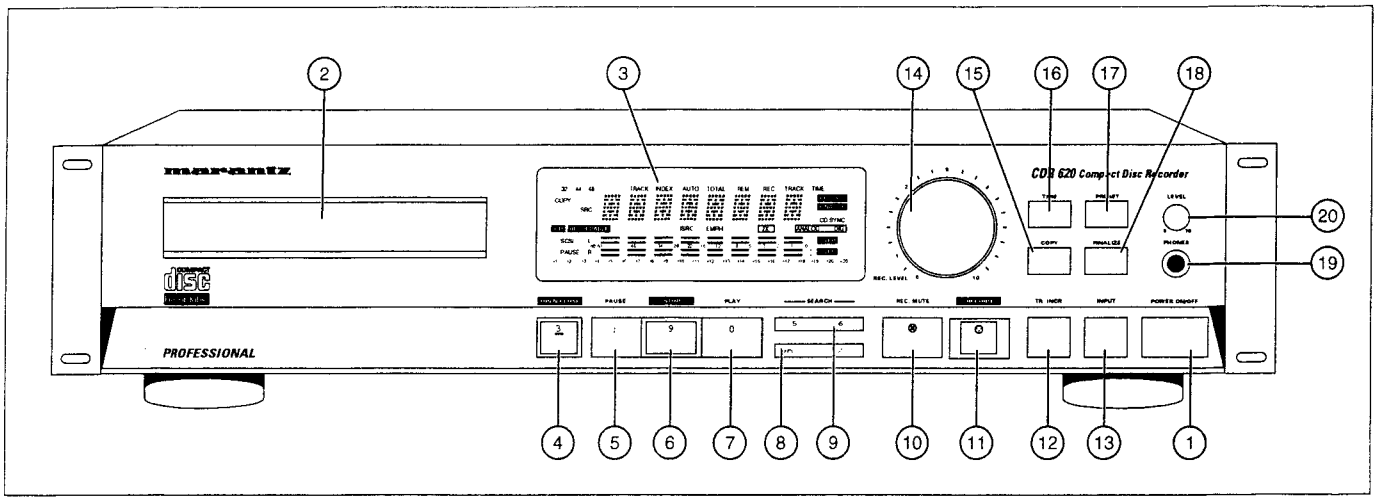
7. **WIRED REMOTE terminal**
   15-pin Sub-D connector for RC620 remote control

8. **CONTROL I/O terminal**
   9-pin Sub-D connector for parallel control

9. **SCSI-II interface (CDR620 ONLY)**
   Connection for host computer

10. **SCSI address selection and termination (CDR620 ONLY)**
    DIP switch setting of the SCSI device number of the unit and SCSI termination ON/OFF.

11. **ANALOG OUTPUT COAXIAL (CDR615 ONLY)**




1. **POWER switch** to switch the recorder on/off

2. **Disc tray** to insert a disc

3. **Display**

4. **OPEN/CLOSE button** to open and close the tray

5. **PAUSE button** to temporarily interrupt recording or playback

6. **STOP button**
   To stop all functions.
   In preset mode: stores preset values.

7. **PLAY button**
   To start playback or start recording from record-standby mode.
   In playback the LED will light up green; in recording mode red; in rec-standby: blinking.

8. **PREVIOUS and NEXT buttons**
   For selecting a track to start playback with or selecting another track during playback.
   In preset mode: changes preset value.
   (see also PRESET)

9. **SEARCH FORWARD and REVERSE buttons**
   Fast search to a particular passage during playback.

10. **REC MUTE button**
    To record a pause at the beginning of a new track.
    (see also PRESET)

11. **RECORD**
    To enter RECORD-STANDBY mode.
    In ISRC-program mode: to store ISRC/UPC data.

12. **TR.INCR. (TRACK INCREMENT)**
    To manually record a new track number during recording

13. **INPUT selector**
    To select recording input; toggles between: XLR ANA, XLR DIG **(CDR620 ONLY)**, COAX DIG.

14. **REC LEVEL control**
    To adjust the recording level of analogue left and right input channels.

15. **COPY button (CDR620 ONLY)**
    To initiate double speed copying between two CDR620 units via the SCSI-II interface.

15. **MONITOR button (CDR615 ONLY)**

16. **TIME button**
    Selection of time display modes.
    Toggles through: track-time, remaining track-time (playback), remaining total time (playback), remaining recording time.

17. **PRESET button**
    To change the recording default presets. Preset values can be changed with the PREVIOUS/NEXT keys and stored with the STOP button.
    Using the preset key will toggle through the PRESET options:
    - Increment select: auto/manual
    - Auto-1
    - Audio delay time
    - Auto track level
    - Input sensitivity: +4/-10dBu
    - Rec Mute time
    - Digital Fade In on/off
    - Digital Fade In Time
    - Digital Fade Out on/off
    - Digital Fade Out Time
    - Cascade on/off **(CDR620 ONLY)**
    - FRONT/SCSI mode **(CDR620 ONLY)**

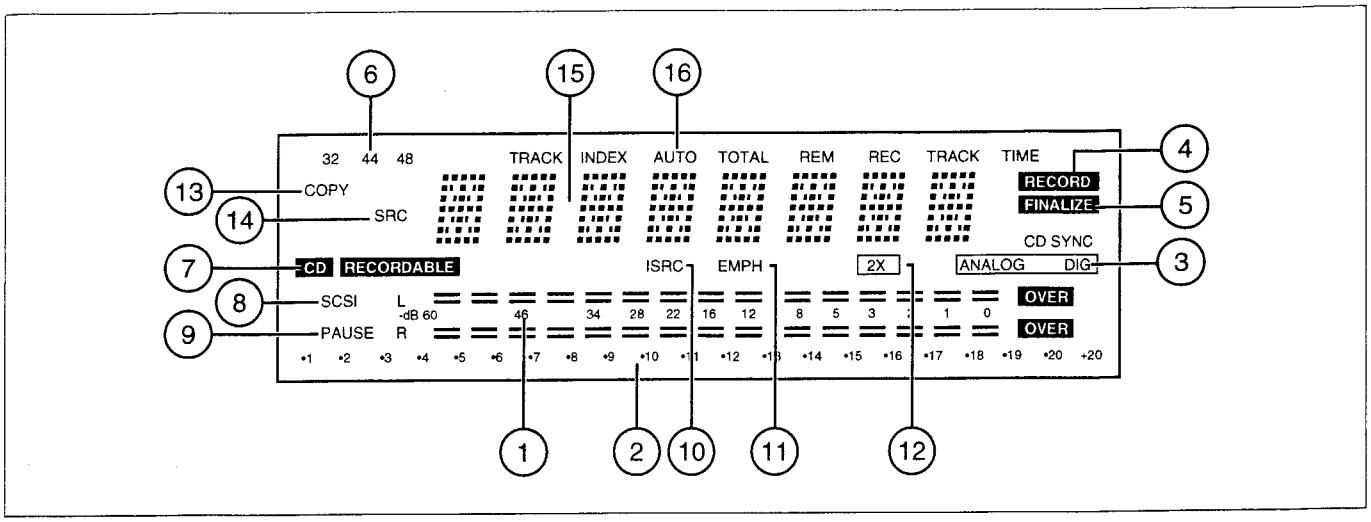
    **IN SCSI MODE ALL KEYS WILL BE DISABLED EXCEPT THE PRESET, OPEN/CLOSE AND POWER ON/OFF KEYS.**

18. **FINALIZE**
    To transform the CDR-disc in the final CD format. Table of contents (TOC) and lead-out will be recorded at double speed.
    Press FINALIZE and then within 2 seconds RECORD.

19. **PHONES connector**
    Connector for standard stereo headphones.

20. **Phones LEVEL**
    To adjust the output level to the headphones.

**WHEN RC620 REMOTE CONTROL IS CONNECTED, THE FRONT PANEL CONTROL AND DISPLAY INDICATION OF CDR620 WILL BE TAKEN OVER BY THE REMOTE CONTROL RC620. THE DISPLAY OF CDR620 WILL INDICATE " REMOTE ".**




1. **Level meter**
   Indication of audio level for recording and playback.
   Standard I/O level of +4/-10 dBu is shown at -12dB.
   OVER: at levels > -0,5 dB.

2. **Track Number indication**
   Shows the number of tracks on the disc.

3. **ANALOGUE/DIG**
   Indication of Analogue or Digital audio input selection.

4. **RECORD**
   Recording indication. Blinking in rec-standby mode.

5. **FINALIZE**
   Lights up when a disc is finalised.

6. **Sampling frequency indicators**
   Displays the sampling frequency of the digital recording source.
   The indicator will show "44" when using the analogue input.

7. **CD RECORDABLE**
   Indication of non-finalised CDR disc. Only "CD" will light up in case of prerecorded or finalised discs.

8. **SCSI (CDR620 ONLY)**
   Will light up in SCSI mode.

9. **PAUSE**

10. **ISRC**
    Will light up in ISRC/UPC mode (see RC620)

11. **EMPH**
    Emphasis indication during recording or playback

12. **2X (CDR620 ONLY)**
    Indication of double speed recording

13. **COPY**
    Will light up when copy-bit is set (see RC620)

14. **SRC**
    Indicates if sample-rate-converter is switched on

15. **Character display**
    Indication of time, track number, index number and status messages of the unit

16. **AUTO**
    Indicating auto-track-increment mode when recording CD-DA.

## OPERATIONAL MODES

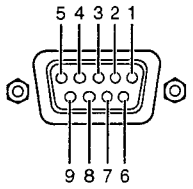
- In **STANDALONE** mode the CDR620 is a fully featured audio recorder designed for the creation/duplication of CD-DA titles.
- In **SCSI** mode and under control of a host computer, titles can be created in ALL CD-formats. **(CDR620 ONLY)**
- In **COPY** mode a double speed copy of Audio discs (CD-DA) can be made. **(CDR620 ONLY)**

## REMOTE CONTROL OPERATION

### CONTROL I/O : Parallel Input Terminals

The 9-pin CONTROL I/O connector on the rear panel has two functions:

- Output: sends logic level signals for PLAY, STOP and PAUSE.
  When one of the front panel or wired remote controls is in use, the parallel remote connection will send a 500 msec pulse (5VDC,50 mA max.)
- Input: receives logic level signals for PLAY, STOP, PAUSE, RECORD and TRACK INCREMENT.
  Connect one of the input pins (1-5) to GND (pin 9) for 20 msec or more; closed contact operation.



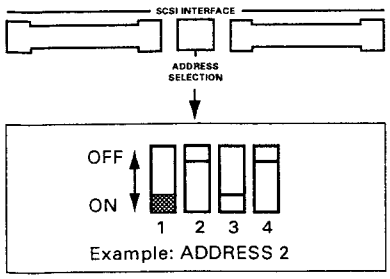

| Pin no. | I/O | |
|---|---|---|
| 1. | IN | PLAY |
| 2. | IN | PAUSE |
| 3. | IN | STOP |
| 4. | IN | REC STANDBY |
| 5. | IN | TRACK INCREMENT |
| 6. | OUT | PLAY |
| 7. | OUT | PAUSE |
| 8. | OUT | STOP |
| 9. | - | GND |

**Control I/O Terminal**

### DIP-SWITCH SETTINGS: (CDR620 ONLY)

The switches are numbered 1,2,3,4 from left to right. The dip-switches are OFF in upper position. Dip-switch 1 will switch the SCSI termination ON/OFF. When SCSI is used, switch 1 must be ON
Switch 2,3,4 determine the SCSI ADDRESS

| DIP-SWITCH | | 2 | 3 | 4 |
|---|---|---|---|---|
| ADDRESS | 0 | OFF | OFF | OFF |
| | 1 | ON | OFF | OFF |
| | 2 | OFF | ON | OFF |
| | 3 | ON | ON | OFF |
| | 4 | OFF | OFF | ON |
| | 5 | ON | OFF | ON |
| | 6 | OFF | ON | ON |
| | 7 | ON | ON | ON |




Example: ADDRESS 2

## TROUBLE SHOOTING

The display will indicate system or user errors by error-number.

| Error-number | Cause and Actions to be taken |
|---|---|
| 02 | no disc detected in the source at High Speed Copy<br>- no disc inside / empty disc inside<br>- replace disc |
| 03 | double speed setting failed<br>- no empty disc in destination<br>- insert empty CDR disc |
| 04 | OPC failed at destination at High Speed Copy<br>- OPC area on the disc is full<br>- replace disc |
| 05 | read error from source during copy process<br>- bad or corrupt disc<br>- replace disc |
| 11 | recovery failed<br>- power off during finalizing<br>- disc will be corrupted |
| 21 | general internal communication error<br>- hardware/communication overflow<br>- power off/on |
| 22 | general startup error<br>- reading disc info failed<br>- power off/on |
| 23 | general read/play error<br>- power off/on |
| 24 | general write/record error<br>- power off/on |
| 25 | general PMA error<br>- power off/on |
| 26 | general OPC error<br>- power off/on |
| 29 | mechanism/servo error<br>- power off/on |
| 99 | general error condition at key input<br>- give correct key input |

## 1.3 TECHNICAL SPECIFICATIONS

### 1. GENERAL

| | | |
|---|---|---|
| 1. | Mains voltage | : 4 pos Voltage selector (100 / 120 / 230 /240 ) |
| 2. | Mains frequency | : 50 Hz/60Hz |
| 3. | Power consumption, operating | : approx. 30 Watt at normal voltage. |
| 4. | Monitoring | : Yes |
| 5. | Finalize | : speed n=2 |
| 6. | Recording delay | :max. 3 sec. n=1 1Mb ram |
| 7. | Sample rate converter | :32 KHz ---> 50KHz |
| 8. | W/O sample rate converter | :44.1 KHz +/- 150ppm |
| 9. | copy | :high speed direct copy -Audio only -Track only. |
| 10. | copy control | : no (SCMS) |
| 11. | One time OPC | :max. number of disc : 10 |

### 2. AUDIO SPECIFICATIONS

### 2.1 BALANCED IN/OUT (monitor path)

| | |
|---|---|
| 1. Output voltage | Load impedance 600 ohm |
| a)input sens. +4 dBu | : +4 dBu (record level -12dB) |
| max. input +16dBu | : +16 dBu (record level max.) |
| max. input +24dBu | : +16 dBu (with adjust level) |
| b)input sens. -10dBu | : +4 dBu (record level -12dB) |
| max. input +2 dBu | : +16 dBu (record level max.) |
| max. input +24dBu | : +16 dBu (with adjust level) |
| c)Deviation | : All value within +/- 0.5 dBu |
| 2. Unbalance | : max. 0.25 dB ( typ. 0 dB) |
| 3. Output Impedance | : 50 Ohm |
| 4. Amplitude linearity | : max. +/- 0.5 dB (20Hz - 20KHz) |
| 5. S/N - Ratio | : min. 90 dB |
| | : typ. 95 dB |
| | : min. 92 dB (A - wtg) |
| 6. Dynamic range | : min. 86 dB ( 1 KHz) |
| | : typ. 88 dB ( 1 KHz) |
| | : min. 85 dB ( 20Hz - 20KHz) |
| 7. THD + Noise | : min. 82 dB ( 20Hz - 20KHz) |
| | : typ. 85 dB ( 20Hz - 20KHz) |
| 8. Out-band attenuation | : min. 55 dB above 25 KHz |
| 9. Channel separation | : min. 90 dB (1 KHz) |
| | : typ. 100 dB ( 1KHz) |
| | : min. 85 dB (20Hz - 20KHz) |
| 10.Muting during random | : min. 90 dB (BW = 20KHz) access |
| | :.Phase linearity |
| 11. | : typ.+/- 4.25 deg |
| | : max.+/- 4.85 deg (20Hz - 20KHz) |
| 12.Low Level Linearity | : Max.+/- 5.5 dB (at -90 dB) |
| | : typ.+/- 2.5 dB (at -90 dB) |

### 2.2 BALANCED ANALOG OUT Playback path only (CDR620 ONLY)

(measurements according to IEC 1096)

| | |
|---|---|
| 1. Output voltage (MAX.) | : +16 dBu /600 ohm load |
| | : 5.6 Vrms +/- 0.15 dB |
| 2. Unbalance | : max. 0.2 dB |
| 3. Output Impedance | : 200 ohm |
| 4. Amplitude linearity | : max. +/- 0.2 dB (20Hz - 20KHz) |
| 5. S/N - Ratio | : 100 dB |
| 6. Dynamic range | : 92 dB ( 1 KHz) |
| 7. THD + Noise | : min. 85 dB ( 20Hz - 20KHz) |
| | : typ. 90 dB ( 20Hz - 20KHz) |
| 8. Out-band attenuation | : min. 55 dB above 25 KHz |
| 9. Channel separation | : min. 90 dB (1 KHz) |
| | : typ. 100 dB 1KHz) |
| | : min. 85 dB (20Hz - 20KHz) |
| | : min. 100 dB with dig. silence kill |
| 10.Muting during random | : min. 90 dB (BW = 20KHz) access |
| 11.Phase linearity | : typ +/- 0.5 deg |
| | : max.+/- 0.6 deg (20Hz - 20KHz) |
| 12 Low level linearity | : max. +/- 4 dB (at -90 dB) |
| | : typ. +/- 1.5 dB(at -90 dB) |

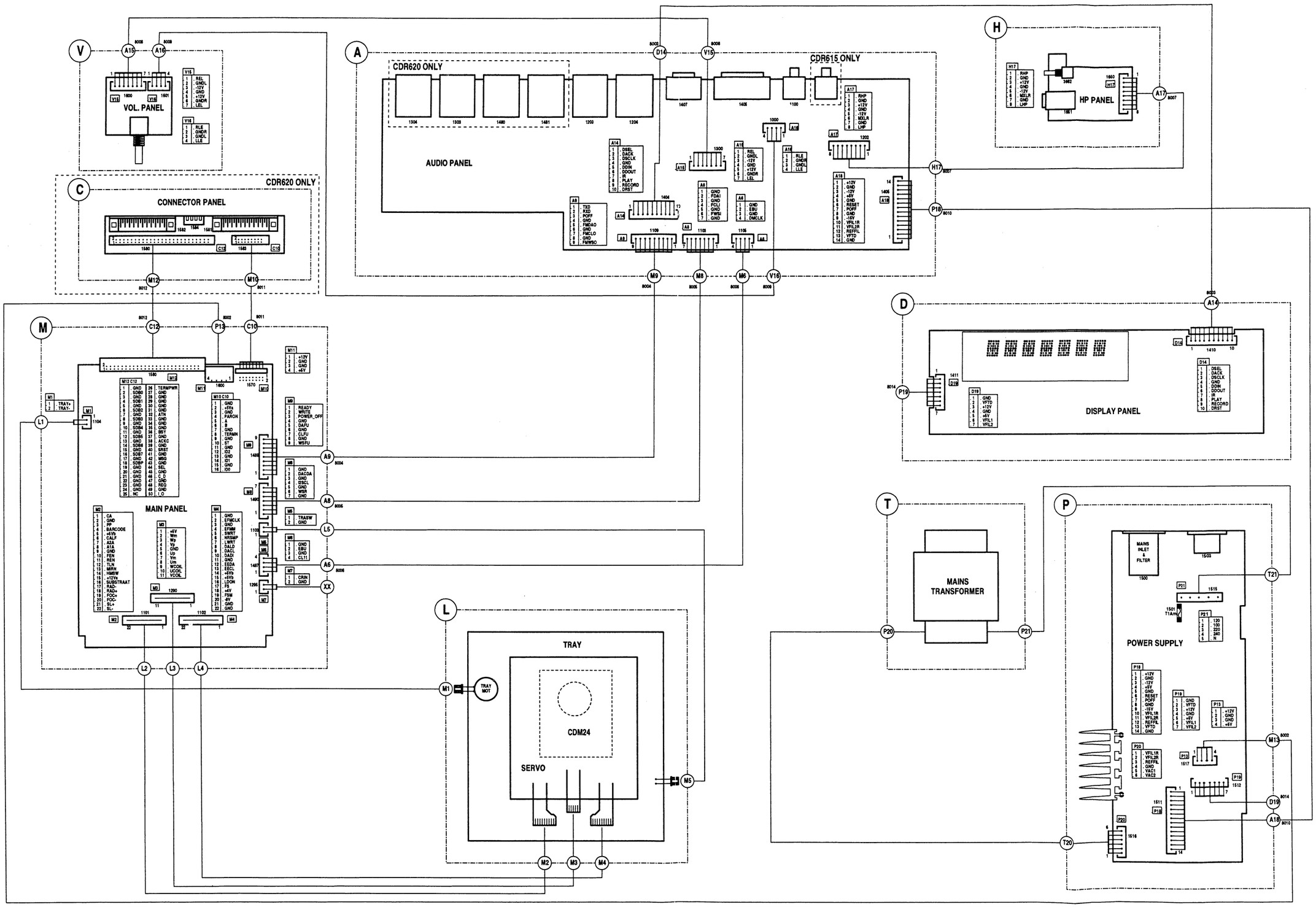
### 2.3 BALANCED ANALOG IN ---> DIGITAL OUT BALANCED

| | |
|---|---|
| 1. Input sensitivity | : +4 dBu /- 10 dBu for max. level |
| a)inputsens. +4 dBu | : +4 dBu (record level -12dB) |
| max. input | : +16 dBu (record level max.) |
| max. input | : +24 dBu (with adjust level) |
| b)inputsens. -10dBu | : +4 dBu (record level -12dB) |
| max. input | : +2 dBu (record level max.) |
| max. input | : +24 dBu (with adjust level) |
| 2. Unbalance | : max. 0.15 dB typ. 0 dB |
| 3. Input Impedance | : 47 KOhm |
| 4. Amplitude linearity | : max. +/- 0.15 dB (20Hz - 20KHz) |
| 5. S/N - Ratio | : min. -92 dB |
| | : typ. -95 dB |
| | : min. -95 dB (A - wtg) |
| 6. Dynamic range | : min. -90 dB ( 1 KHz) |
| | : typ. -93 dB ( 1 KHz) |
| | : min. -90 dB ( 20Hz - 20KHz) |
| 7. THD + Noise | : min. -87 dB ( 1 KHz) |
| | : typ. -92 dB ( 1 KHz) |
| 8. Out-band attenuation | : min. -60 dB above 25 KHz |
| 9. Channel separation | : min. -90 dB (1 KHz) |
| | : typ. -100 dB ( 1KHz) |
| | : min. -87 dB (20Hz - 20KHz) |
| 10.Phase linearity | : typ +/- 3.25 deg |
| | : max.+/- 3.85 deg (20Hz - 20KHz) |
| 11 Low level linearity | : max. +/- 1.5 dB (at -90 dB) |
| | : typ. +/- 1 dB (at -90 dB) |

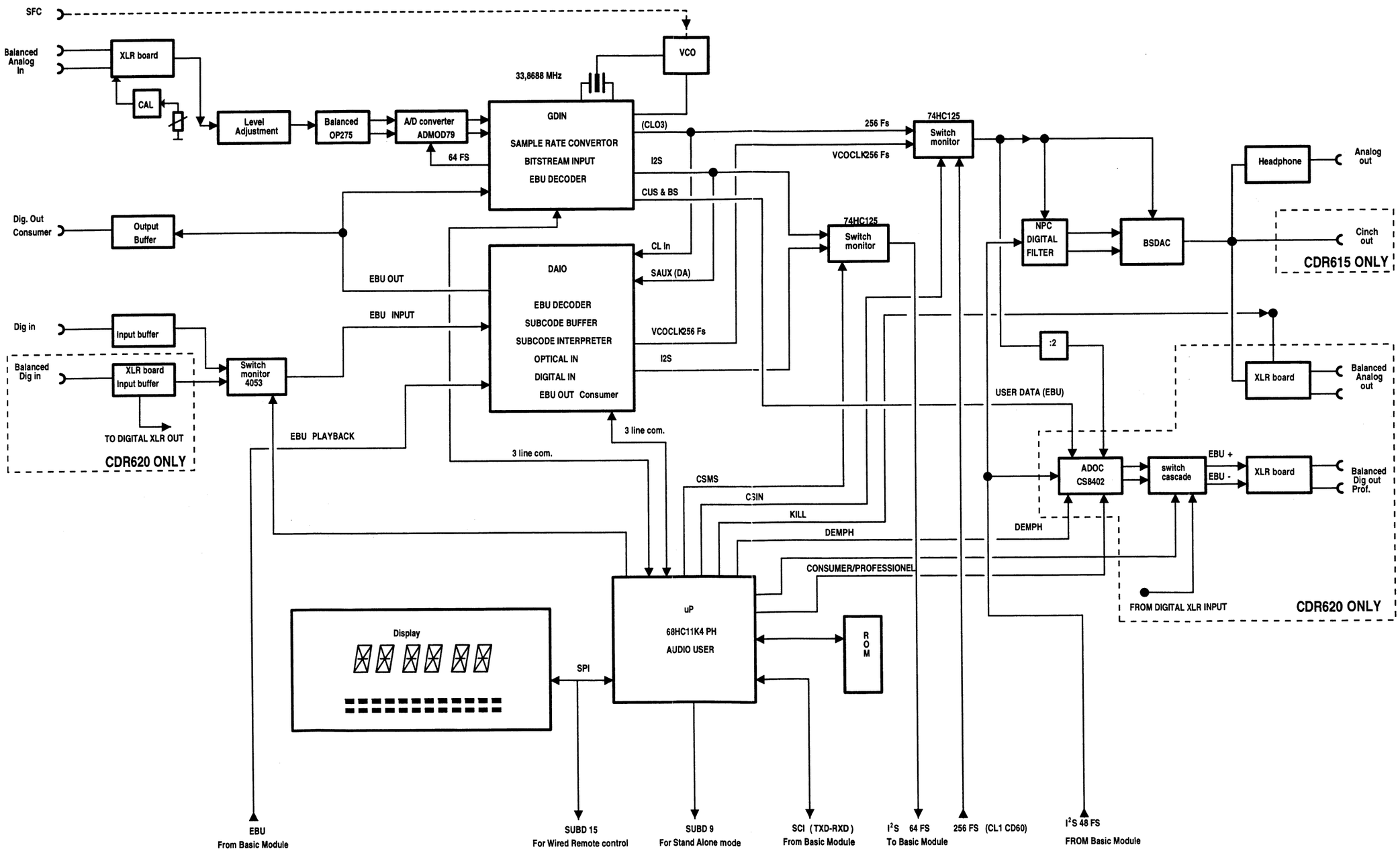
### 2.4 HEADPHONE OUTPUT (measurements according to IEC 1096)

| | |
|---|---|
| 1. Output voltage | : 0 to 6.5 Vrms +/- 2 dB (no load) |
| | : 0 to 5.42Vrms +/-2 dB (600 ohm load) |
| 2. Output Impedance | : 120 ohm |
| 3. Load impedance range | : 8, 32, 200, 600, 1000, 2000 ohm |
| 4. Output power | : 0 - 58 mW into 32 ohm |
| | : 0 - 49 mW into 600 ohm |
| | : 0 - 88 mW into 120 ohm |
| 5. Unbalance | : 2 dB |
| 6. Phase linearity | : typ. +/- 0.225 deg. |
| | : max. +/- 0.35 deg (20Hz - 20KHz) |
| 7. S/N Ratio | : typ. -93 dB load 600 ohm |
| | : min. -90 dB |
| 8. Dynamic Range | : min. -90 dB (1KHz) load 600 ohm |
| | : min. -88 dB (20Hz - 20KHz) |
| 9. THD + Noise | : min. -84 dB ( 1KHz) load 600 ohm |
| 10.Channel separation | : min. -65 dB (20Hz - 20KHz) load 600 Ohm |

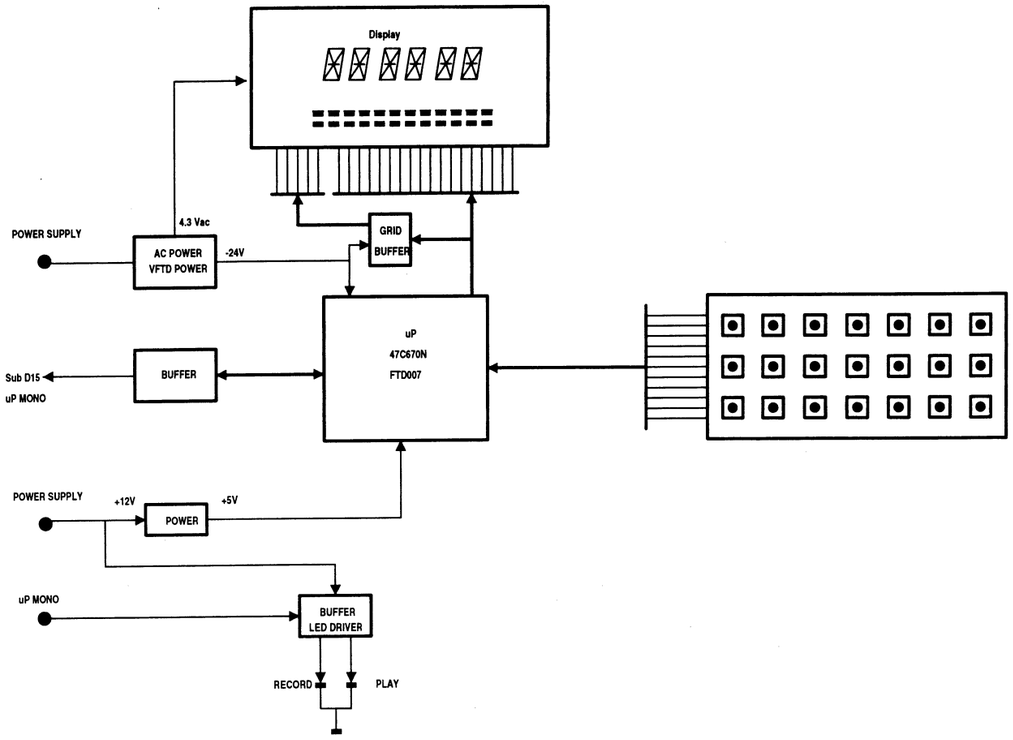
## 1.4 WIRING DIAGRAM



# BLOCK DIAGRAM µP/MONO PCB

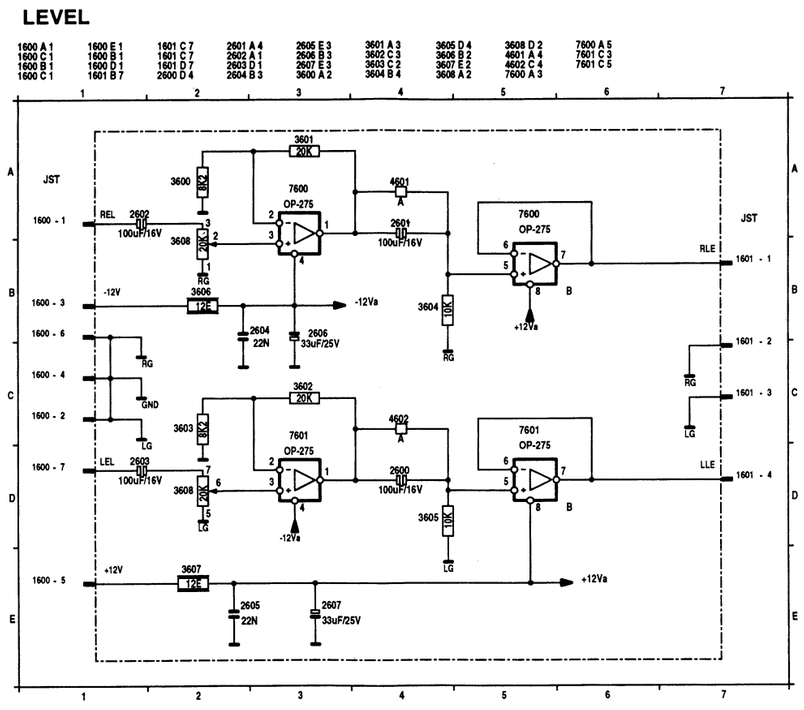


# BLOCK DIAGRAM DISPLAY PCB



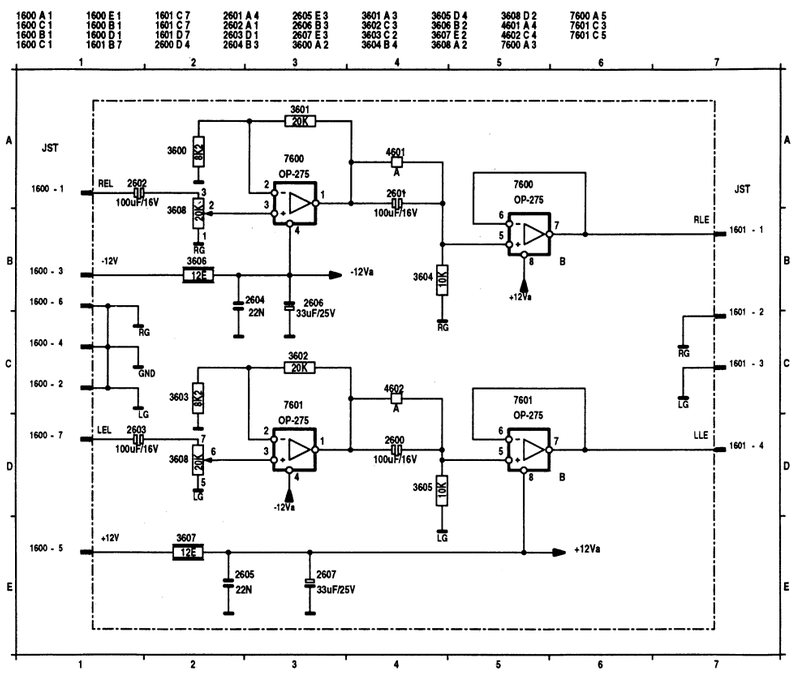




## 1.6 SCHEMATIC DIAGRAM AND PARTS LOCATION

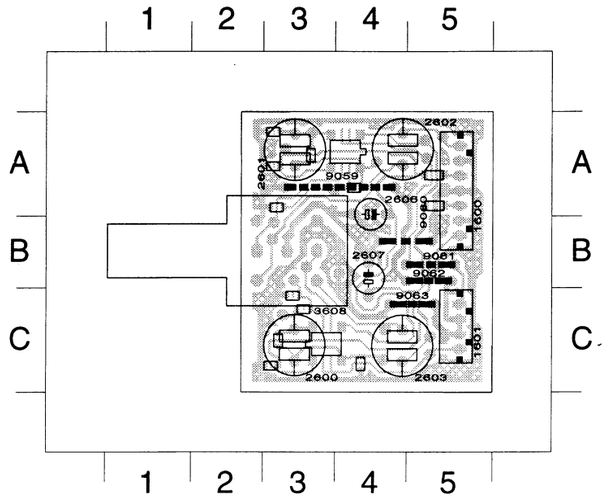
### LEVEL




### LEVEL BOARD

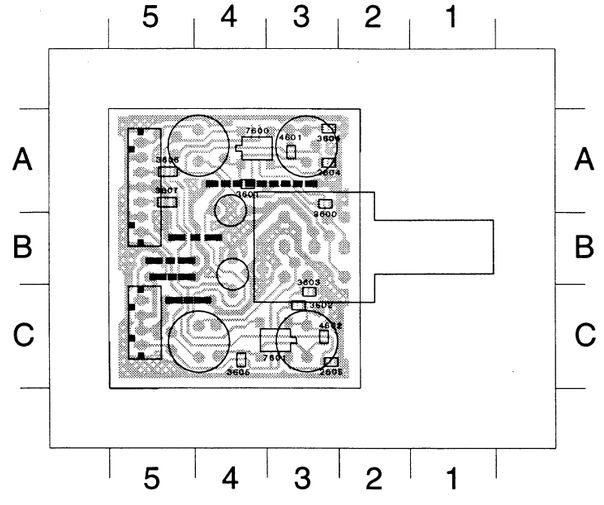
#### COMPONENT SIDE

1600 A 5 2600 C 3 2602 A 4 2606 A 4 3608 B 3 9060 B 4 9062 B 5
1601 C 5 2601 A 3 2603 C 4 2607 B 4 9059 A 4 9061 B 5 9063 C 5

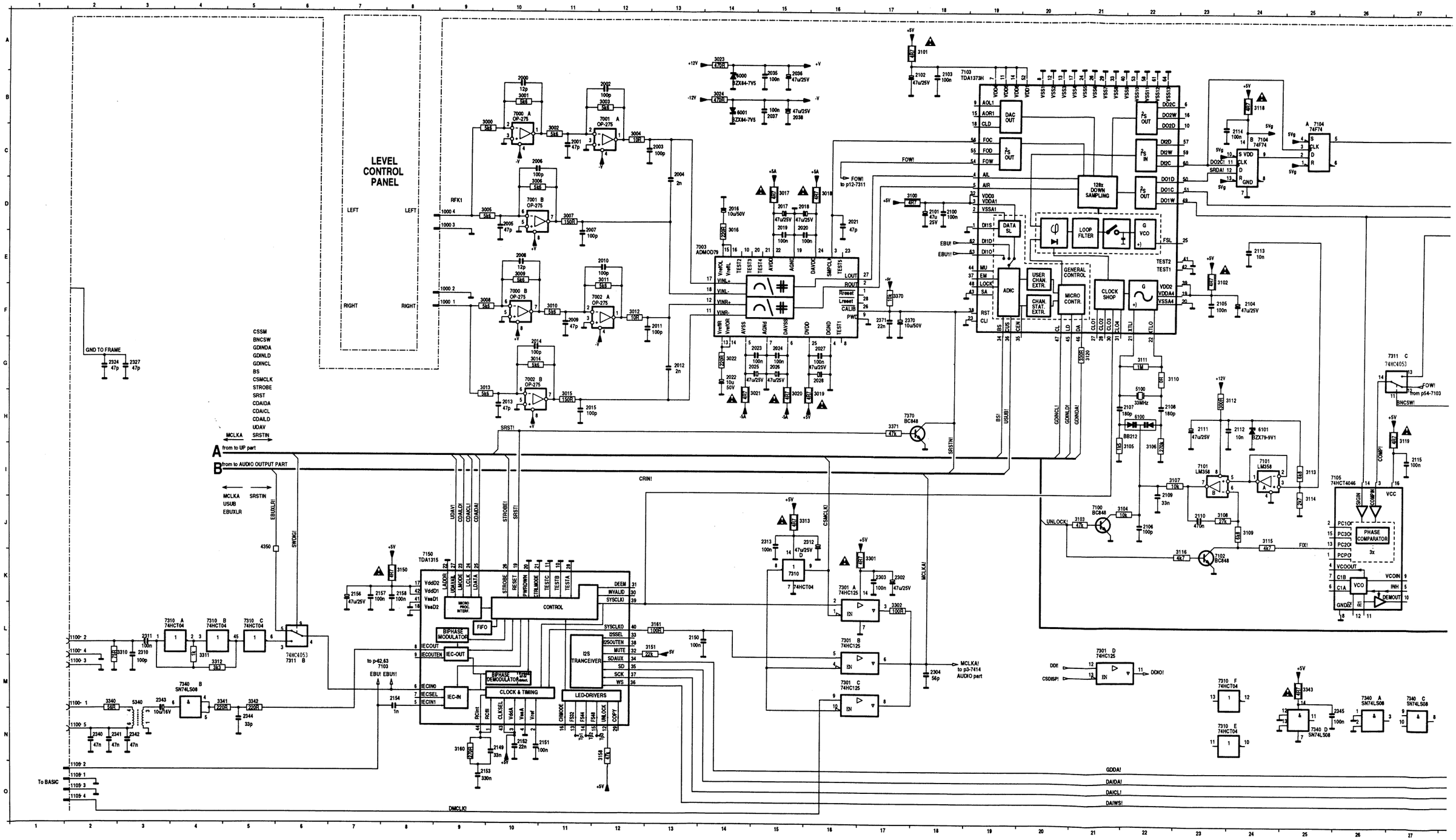


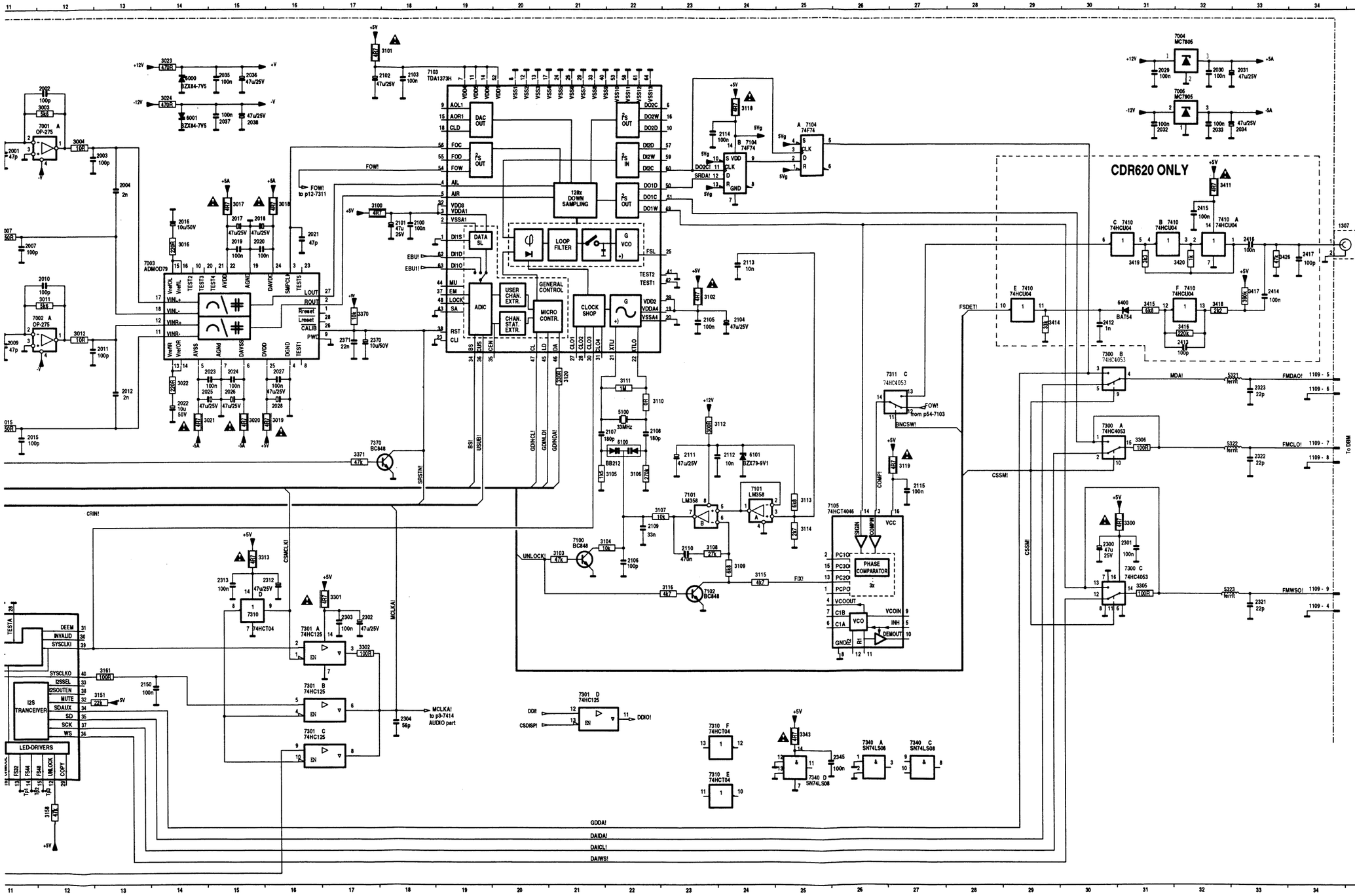

#### SOLDER SIDE

2604 A 3 3600 A 3 3602 C 3 3604 A 3 3606 A 5 4601 A 3 7600 A 4
2605 C 3 3601 A 4 3603 C 3 3605 C 4 3607 A 5 4602 C 3 7601 C 3

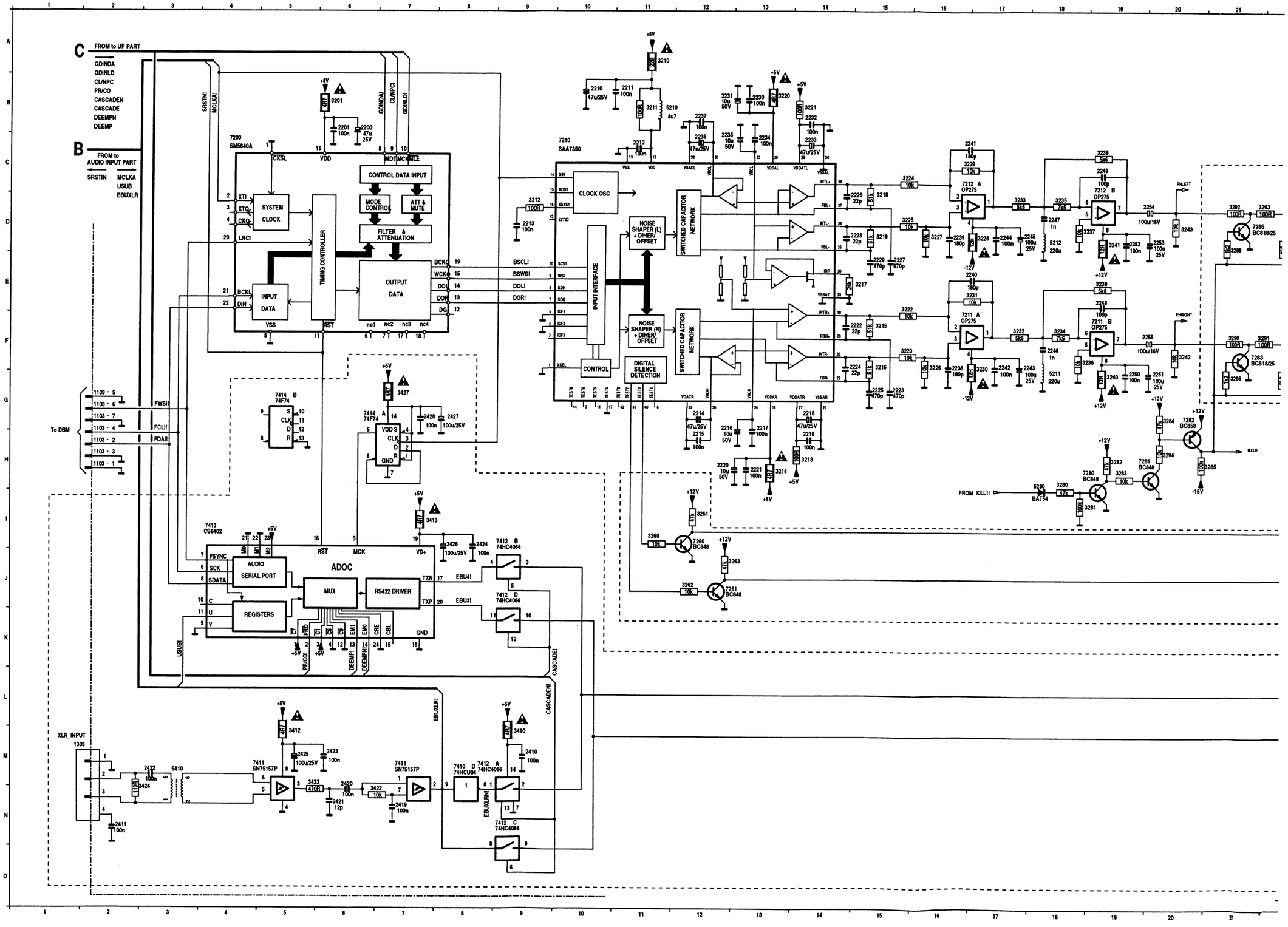


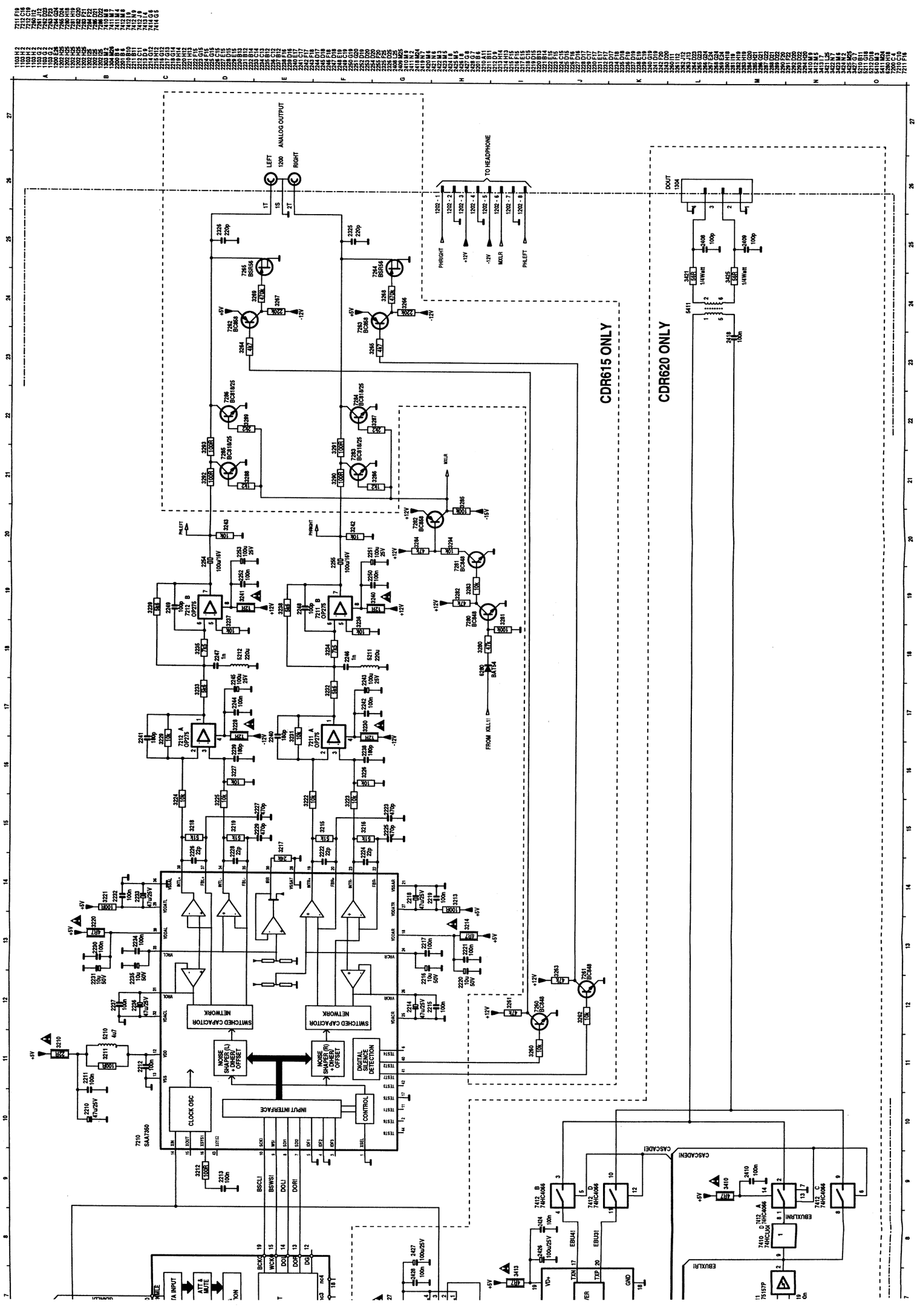
## AUDIO INPUT PART



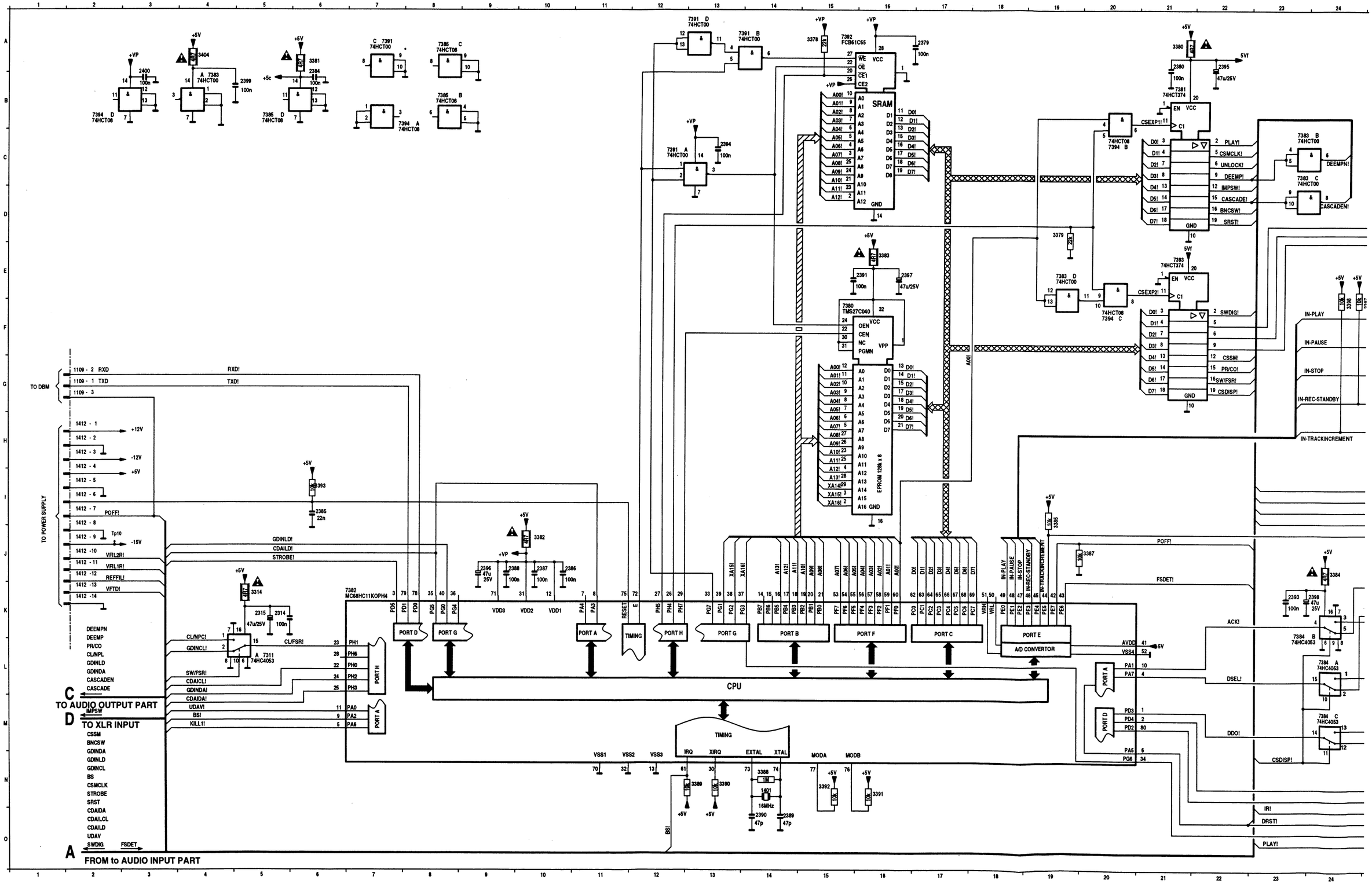

CDR620 ONLY
7003 ADMOD79
7100 BC848
7101 LM358
7102 BC848
7103 LM358
7103 TDA1373H
7105 74HCT4046
7300 A 74HC4053
7300 B 74HC4053
7300 C 74HC4053
7301 A 74HC125
7301 B 74HC125
7301 C 74HC125
7301 D 74HC125
7310 E 74HC04
7310 F 74HC04
7311 C 74HC4053
7340 A SN74LS08
7340 C SN74LS08
7340 D SN74LS08
7370 BC848
7371 BC848
7410 A 74HCU04
7410 B 74HCU04
7410 C 74HCU04
7410 E 74HCU04
7410 F 74HCU04
A 7104 74F74
B 7104 74F74
7004 MC7805
7006 MC7905
I2S TRANCEIVER
LED-DRIVERS
DAC OUT
ADC
DATA SL
USER CHAN. EXTR.
CHAN. STAT. EXTR.
GENERAL CONTROL
MICRO CONTR.
128x DOWN SAMPLING
LOOP FILTER
CLOCK SHOP
PHASE COMPARATOR
VCO
FOW!
FSDET!
BNCSW!
CSSM!
CRIN!
MCLKA!
GDOA!
DAIDA!
DAICL!
DAIWS!
MDA!
FMDAO!
FMCLO!
FMWSO!
To DBM
from p54-7103
to p12-7311
to p3-7414 AUDIO part

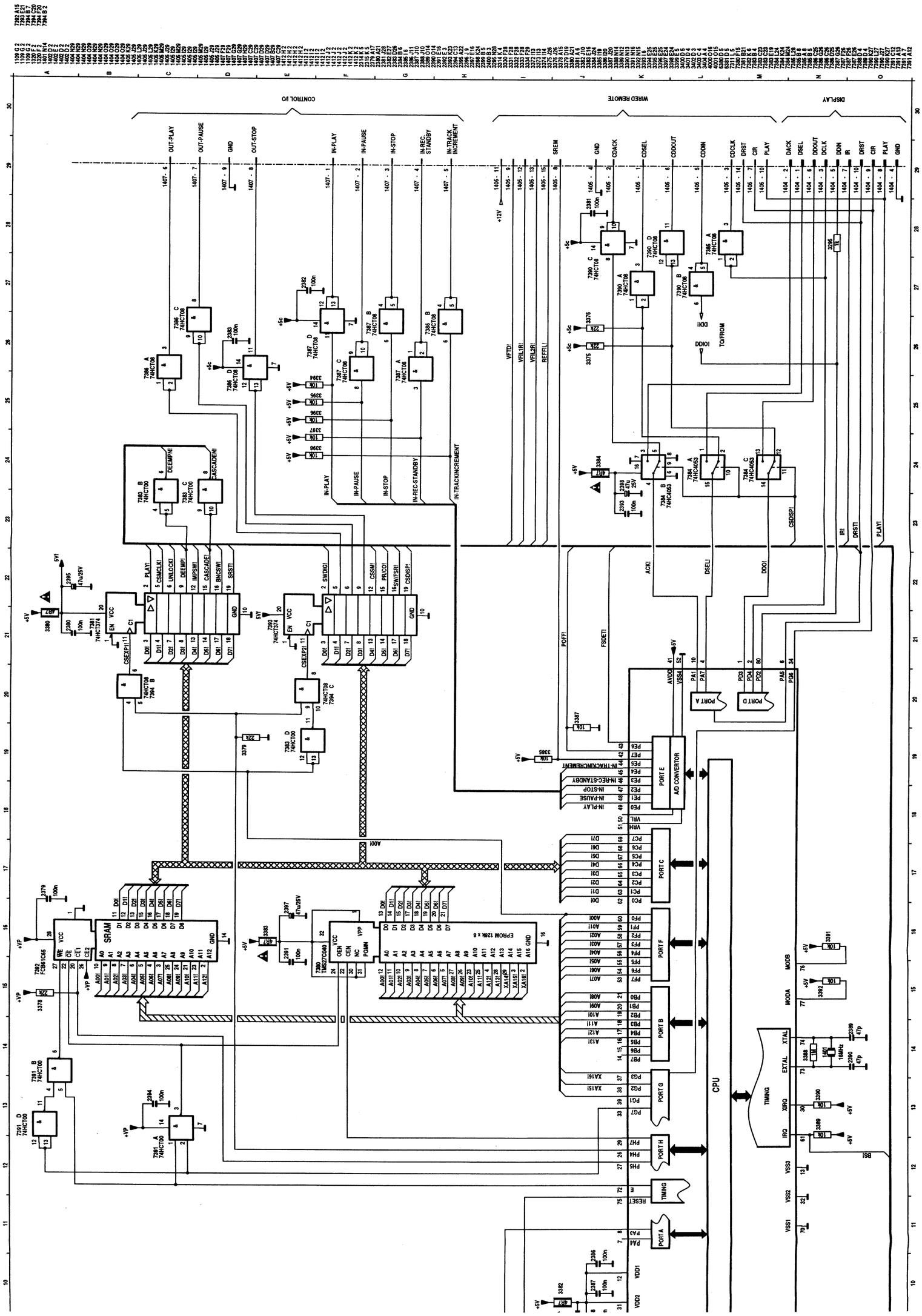
## AUDIO OUTPUT PART



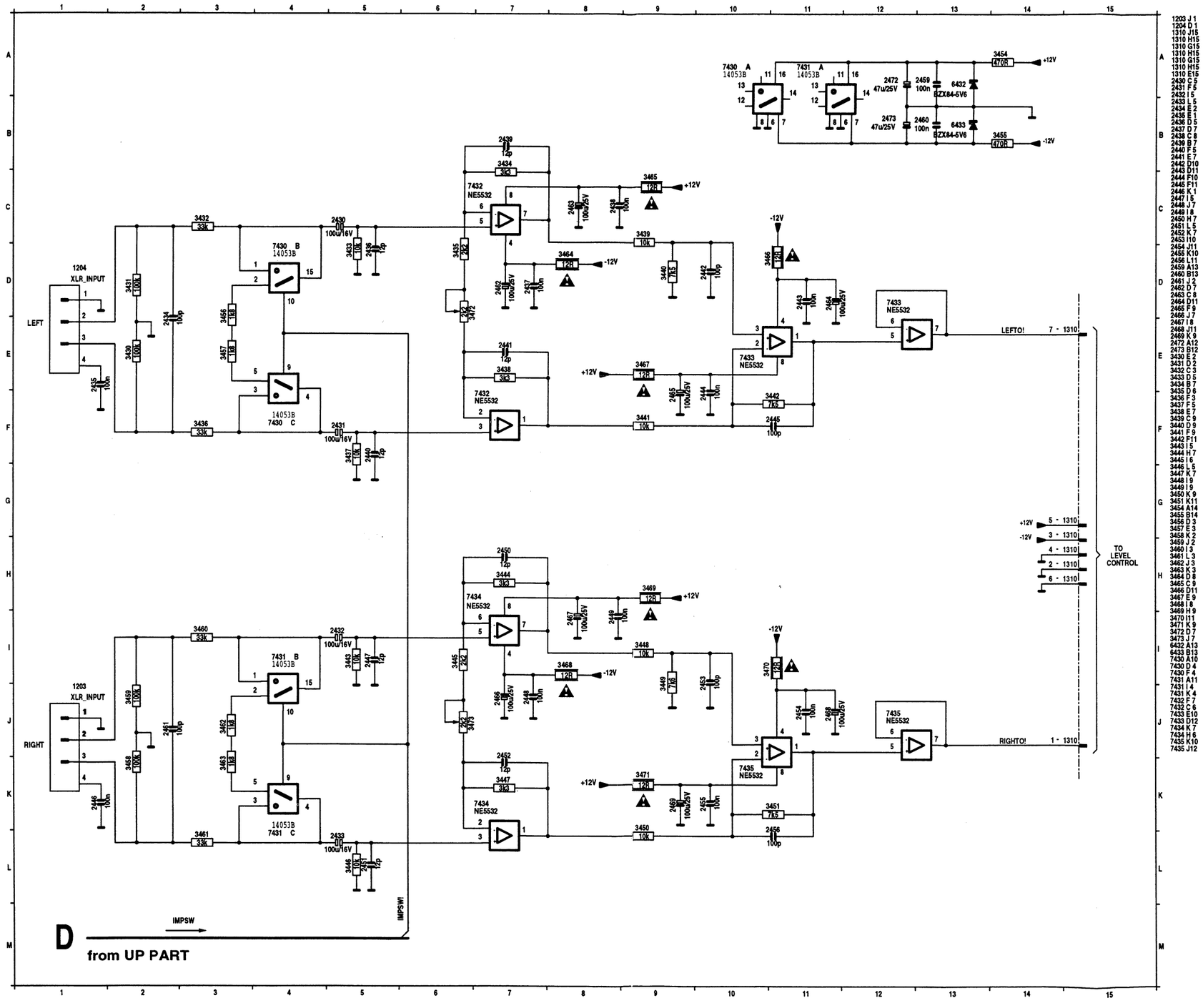

CDR615 ONLY
CDR620 ONLY
ANALOG OUTPUT
LEFT
RIGHT
TO HEADPHONE
DOUT
SWITCHED CAPACITOR NETWORK
CLOCK OSC
INPUT INTERFACE
CONTROL
DIGITAL SILENCE DETECTION
NOISE SHAPER (L) + DIRECT OFFSET
NOISE SHAPER (R) + DIRECT OFFSET
SAA7350
CASCADEI
CASCADEO
EBUXLRI
EBUXLRO
FROM KILL11

## UP PART


TO DBM
TO POWER SUPPLY
1109 - 2 RXD
1109 - 1 TXD
1109 - 3
RXD!
TXD!
1412 - 1 +12V
1412 - 2
1412 - 3 -12V
1412 - 4 +5V
1412 - 5
1412 - 6
1412 - 7 POFF!
1412 - 8
1412 - 9 Tp10 -15V
1412 - 10 VFIL2R!
1412 - 11 VFIL1R!
1412 - 12 REFFIL!
1412 - 13 VFTD!
1412 - 14
GDINLD!
CDAILD!
STROBE!
DEEMPN
DEEMP
PR/CO
CL/NPL
GDINLD
GDINDA
CASCADEN
CASCADE
IMPSW
CSSM
BNCSW
GDINDA
GDINLD
GDINCL
BS
CSMCLK
STROBE
SRST
CDAIDA
CDAILCL
CDAILD
UDAV
SWDIG
FSDET
C
TO AUDIO OUTPUT PART
D
TO XLR INPUT
A
FROM to AUDIO INPUT PART
7382 MC68HC11KOPH4
PORT D
PORT G
PORT A
TIMING
PORT H
PORT G
PORT B
PORT F
PORT C
PORT E
A/D CONVERTOR
CPU
TIMING
SRAM
EPROM 128k x 8
CL/NPC!
GDINCL!
CL/FSR!
SW/FSR!
CDAICL!
GDINDA!
CDAIDA!
UDAV!
BS!
KILL1!
CSEXP1!
CSEXP2!
PLAY!
CSMCLK!
UNLOCK!
DEEMP!
IMPSW!
CASCADE!
BNCSW!
SRST!
SWDIG!
CSSM!
PR/CO!
SW/FSR!
CSDISP!
DEEMPN!
CASCADEN!
IN-PLAY
IN-PAUSE
IN-STOP
IN-REC-STANDBY
IN-TRACKINCREMENT
POFF!
FSDET!
ACK!
DSEL!
DDO!
IRI
DRST!
PLAY!
BSI
A00!

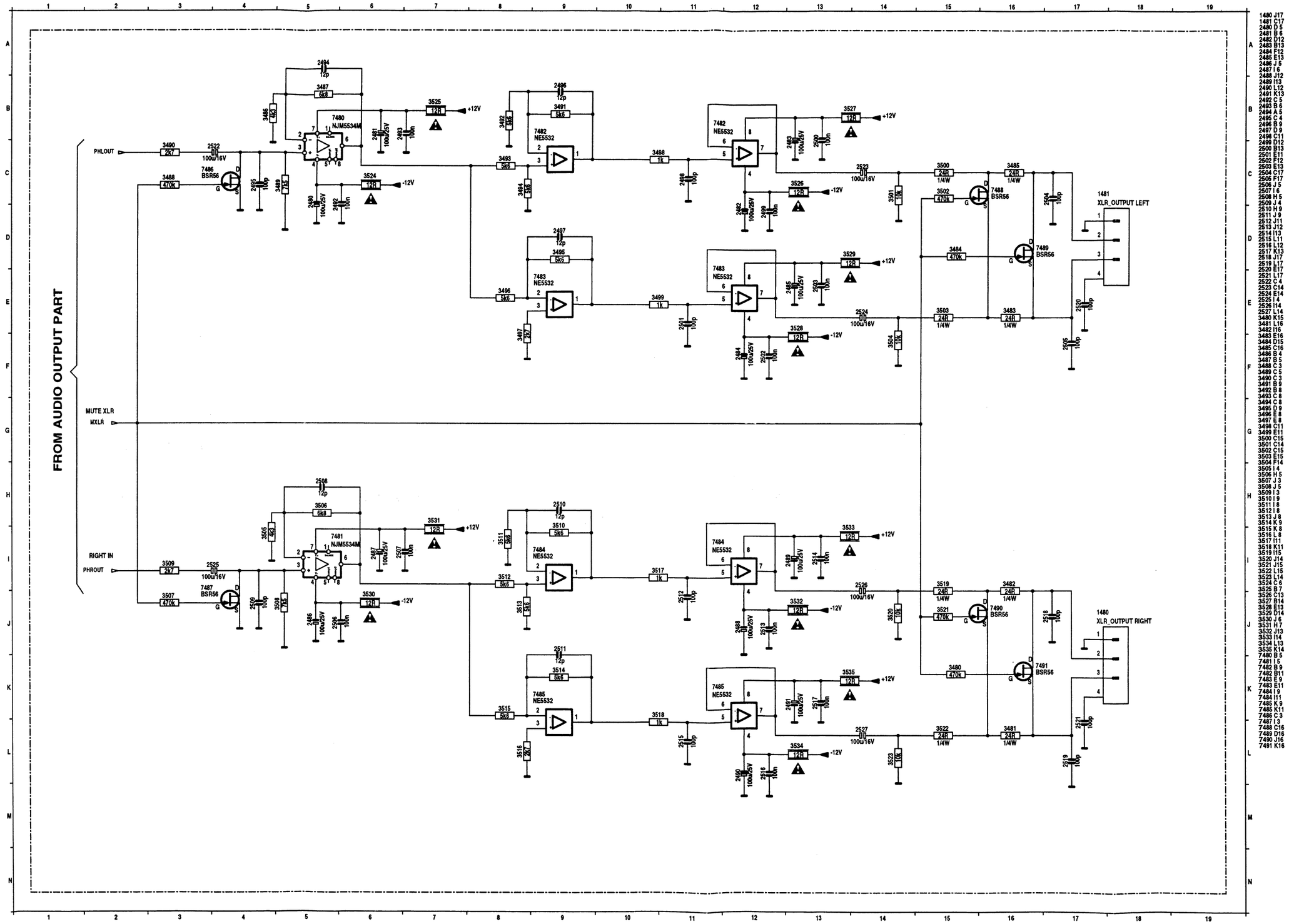

CONTROL I/O
WIRED REMOTE
DISPLAY
OUT-PLAY
OUT-PAUSE
GND
OUT-STOP
IN-PLAY
IN-PAUSE
IN-STOP
IN-REC. STANDBY
IN-TRACK INCREMENT
+12V
VFTDI
VFIL1RI
VFIL2RI
REFFILI
SREM
GND
CDACK
CDSEL
CDDOUT
CDDIN
CDCLK
DRST
CIR
PLAY
DACK
DSEL
DDOUT
DCLK
DDIN
IR
DRST
CIR
PLAY
GND
DEEMPH
CASCADE
DDI0
DDI0I
TO/FROM
CSMCLK1
UNLOCK1
DEEMP1
MPSW1
CASCADE1
BNCSW1
SRST1
PLAY1
SWDIG1
CSSM1
PROC01
SW1/FSR1
CSDSP1
CSEXP1
CSEXP2
ACK1
DSEL1
DDO1
POFF1
FSDET1
PORT A
PORT D
PORT E
A/D CONVERTOR
IN-TRACKINCREMENT
IN-REC-STANDBY
IN-STOP
IN-PAUSE
IN-PLAY
PORT C
PORT F
PORT B
PORT G
PORT H
TIMING
CPU
SRAM
EPROM 128K x 8
A001
DRST1
IRI
PLAY1
BSI
MODB
MODA
XTAL
EXTAL
XIRQ
IRQ
VDD1
VDD2
VSS1
VSS2
VSS3

## XLR INPUT PART




1203 J 1
1204 D 1
1310 J15
1310 H15
1310 G15
1310 H15
1310 G15
1310 H15
1310 E15
2430 C 5
2431 F 5
2432 I 5
2433 L 5
2434 E 2
2435 E 1
2436 D 5
2437 D 7
2438 C 8
2439 B 7
2440 F 5
2441 E 7
2442 D10
2443 D11
2444 F10
2445 F11
2446 K 1
2447 I 5
2448 J 7
2449 I 8
2450 H 7
2451 L 5
2452 K 7
2453 I10
2454 J11
2455 K10
2456 L11
2459 A13
2460 B13
2461 J 2
2462 D 7
2463 C 8
2464 D11
2465 F 9
2466 J 7
2467 I 8
2468 J11
2469 K 9
2472 A12
2473 B12
3430 E 2
3431 D 2
3432 C 3
3433 D 5
3434 B 7
3435 D 6
3436 F 3
3437 F 5
3438 E 7
3439 C 9
3440 D 9
3441 F 9
3442 F11
3443 I 5
3444 H 7
3445 I 6
3446 L 5
3447 K 7
3448 I 9
3449 I 9
3450 K 9
3451 K11
3454 A14
3455 B14
3456 D 3
3457 E 3
3458 K 2
3459 J 2
3460 I 3
3461 L 3
3462 J 3
3463 K 3
3464 D 8
3465 C 9
3466 D11
3467 E 9
3468 I 8
3469 H 9
3470 I11
3471 K 9
3472 D 7
3473 J 7
6432 A13
6433 B13
7430 A10
7430 D 4
7430 F 4
7431 A11
7431 I 4
7431 K 4
7432 F 7
7432 C 6
7433 E10
7433 D12
7434 K 7
7434 H 6
7435 K10
7435 J12

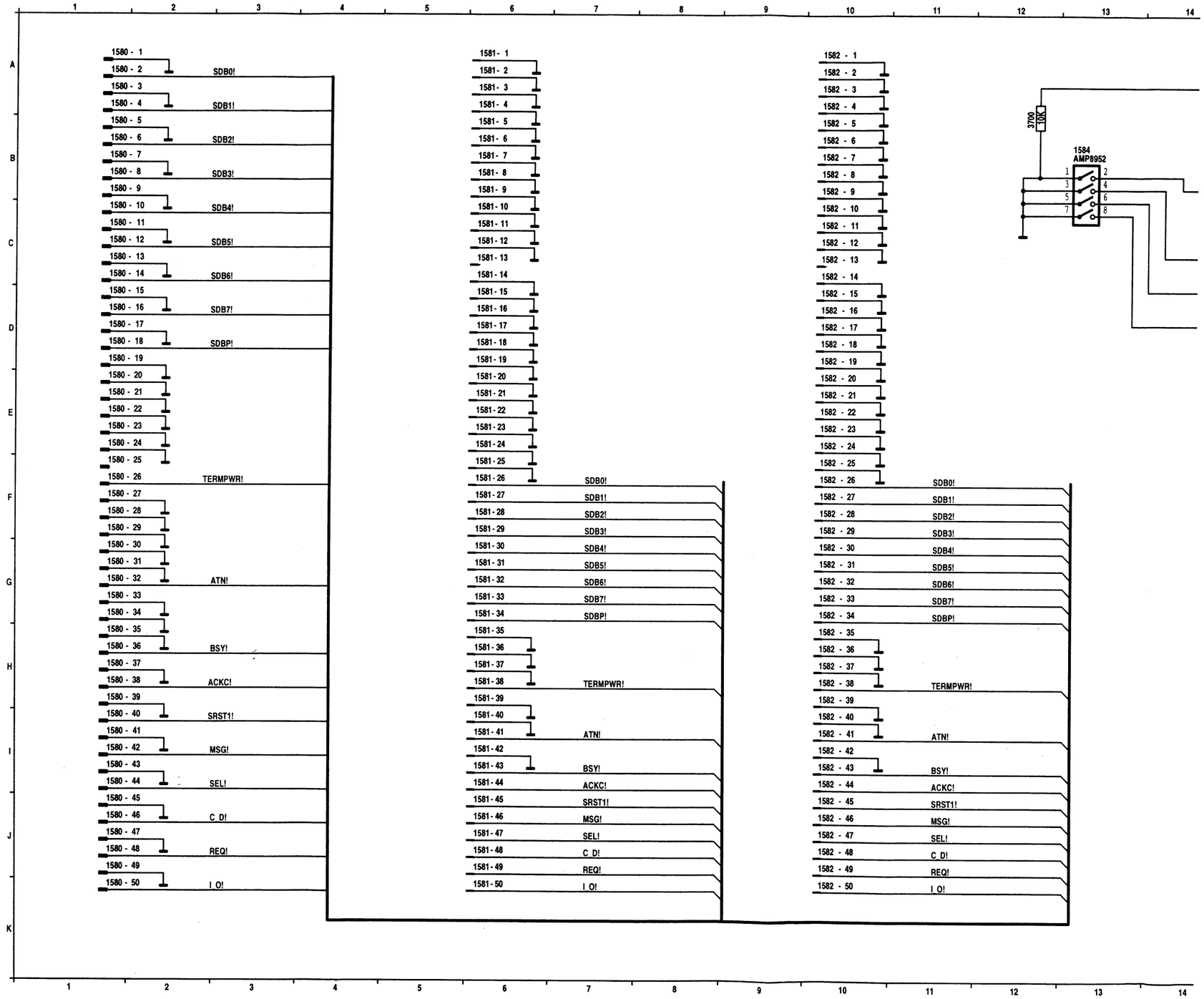
## XLR OUTPUT PART (CDR620 ONLY)



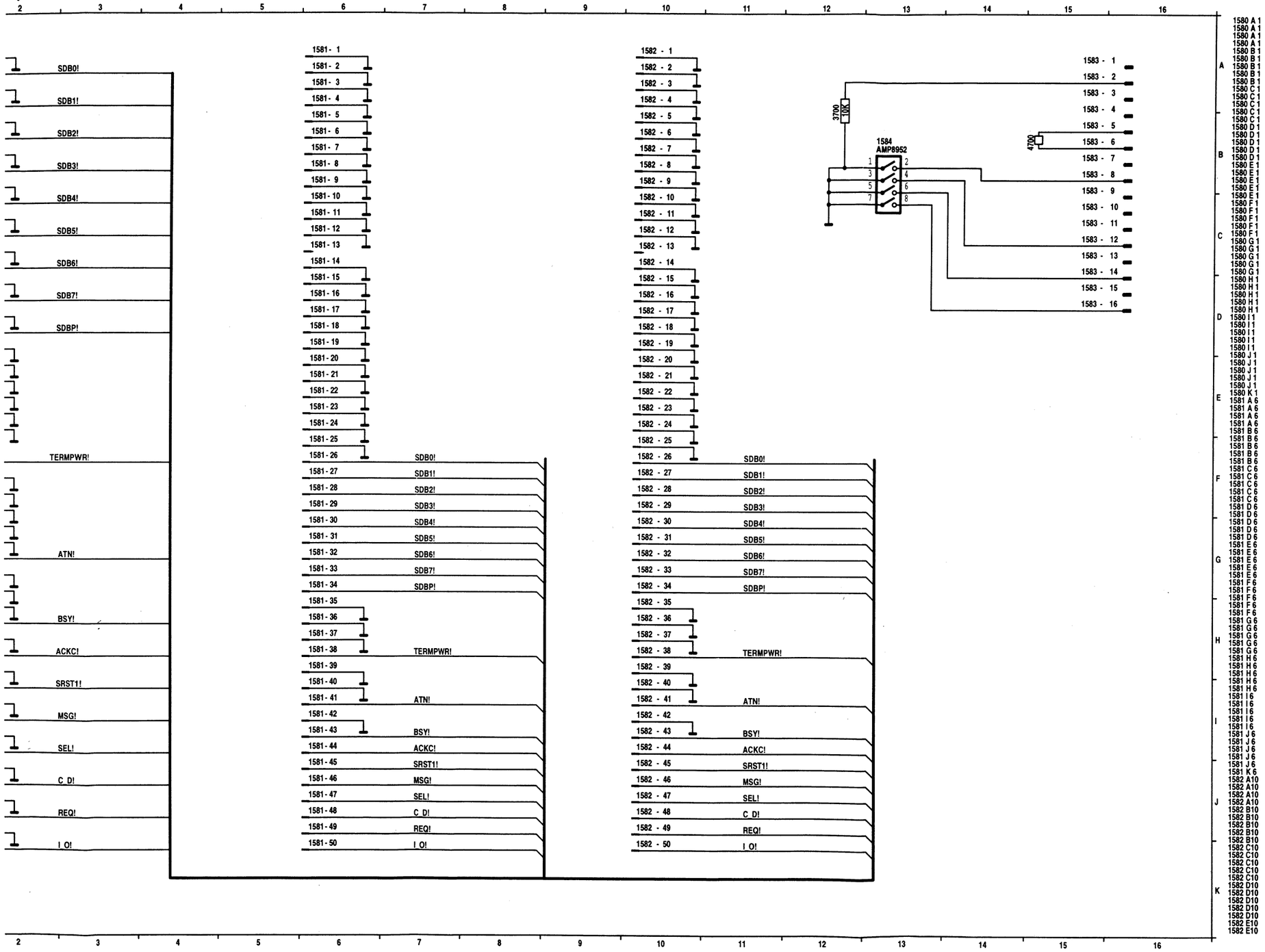


1480 J17
1481 C17
2480 D 5
2481 B 6
2482 D12
2483 B13
2484 F12
2485 E13
2486 J 5
2487 I 6
2488 J12
2489 I13
2490 L12
2491 K13
2492 C 5
2493 B 6
2494 A 5
2495 G 4
2496 B 9
2497 D 9
2498 C11
2499 D12
2500 B13
2501 E11
2502 F12
2503 E13
2504 C17
2505 F17
2506 J 5
2507 I 6
2508 H 5
2509 J 4
2510 H 9
2511 J 9
2512 J11
2513 J12
2514 I13
2515 L11
2516 L12
2517 K13
2518 J17
2519 L17
2520 E17
2521 L17
2522 C 4
2523 C14
2524 E14
2525 I 4
2526 I14
2527 L14
3480 K15
3481 L16
3482 I16
3483 E16
3484 D15
3485 C16
3486 B 4
3487 B 5
3488 C 3
3489 C 5
3490 C 3
3491 B 9
3492 B 8
3493 C 8
3494 C 8
3495 D 9
3496 E 8
3497 E 8
3498 C11
3499 E11
3500 C15
3501 C14
3502 C15
3503 E15
3504 F14
3505 I 4
3506 H 5
3507 J 3
3508 J 5
3509 I 3
3510 I 9
3511 I 8
3512 I 8
3513 J 8
3514 K 9
3515 K 8
3516 L 8
3517 I11
3518 K11
3519 I15
3520 J14
3521 J15
3522 L15
3523 L14
3524 C 6
3525 B 7
3526 C13
3527 B14
3528 E13
3529 D14
3530 J 6
3531 H 7
3532 J13
3533 I14
3534 L13
3535 K14
7480 B 5
7481 I 5
7482 B 9
7482 B11
7483 E 9
7483 E11
7484 I 9
7484 I11
7485 K 9
7485 K11
7486 C 3
7487 I 3
7488 C16
7489 D16
7490 J16
7491 K16

## SCSI INTERFACE (CDR620 ONLY)



## (CDR620 ONLY)




1580 A 1 1582 E10
1580 A 1 1582 E10
1580 A 1 1582 E10
1580 A 1 1582 F10
1580 B 1 1582 F10
1580 B 1 1582 F10
1580 B 1 1582 F10
1580 B 1 1582 F10
1580 B 1 1582 G10
1580 C 1 1582 G10
1580 C 1 1582 G10
1580 C 1 1582 G10
1580 C 1 1582 G10
1580 C 1 1582 H10
1580 D 1 1582 H10
1580 D 1 1582 H10
1580 D 1 1582 H10
1580 D 1 1582 H10
1580 D 1 1582 I10
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1580 E 1 1582 I10
1580 E 1 1582 J10
1580 F 1 1582 J10
1580 F 1 1582 J10
1580 F 1 1582 J10
1580 F 1 1582 J10
1580 F 1 1582 K10
1580 G 1 1583 A15
1580 G 1 1583 A15
1580 G 1 1583 A15
1580 G 1 1583 A15
1580 G 1 1583 B15
1580 H 1 1583 B15
1580 H 1 1583 B15
1580 H 1 1583 B15
1580 H 1 1583 B15
1580 H 1 1583 C15
1580 I 1 1583 C15
1580 I 1 1583 C15
1580 I 1 1583 C15
1580 I 1 1583 C15
1580 I 1 1583 D15
1580 J 1 1583 D15
1580 J 1 1584 B13
1580 J 1 3700 A12
1580 J 1 4700 B15
1580 J 1
1580 K 1
1581 A 6
1581 A 6
1581 A 6
1581 A 6
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1581 C 6
1581 C 6
1581 C 6
1581 C 6
1581 C 6
1581 D 6
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1581 F 6
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1581 G 6
1581 G 6
1581 G 6
1581 G 6
1581 G 6
1581 H 6
1581 H 6
1581 H 6
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1581 I 6
1581 I 6
1581 I 6
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1581 I 6
1581 J 6
1581 J 6
1581 J 6
1581 J 6
1581 J 6
1581 K 6
1582 A10
1582 A10
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1582 A10
1582 B10
1582 B10
1582 B10
1582 B10
1582 B10
1582 C10
1582 C10
1582 C10
1582 C10
1582 C10
1582 D10
1582 D10
1582 D10
1582 D10
1582 D10
1582 D10
1582 E10
1582 E10

## COMPONENT SIDE

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1000 A 8 | 1204 A 5 | 1404 C 5 | 2013 A 8 | 2032 B 7 | 2102 C 8 | 2201 C 9 | 2236 C 9 | 2254 A 9 | 2344 C 7 | 2396 C 4 | 2430 A 6 | 2467 A 5 | 2484 B 4 | 2523 A 3 | 3017 B 7 | 3119 C 9 | 3161 C 7 | 3268 A 9 | 3295 C 5 | 3381 B 6 | 3425 A 1 | 3482 A 2 | 4101 C 9 | 5411 A 1 | 7001 |
| 1100 A 8 | 1300 B 9 | 1405 A 7 | 2016 B 7 | 2034 B 7 | 2104 C 8 | 2210 C 9 | 2242 B 9 | 2255 A 9 | 2350 A 7 | 2397 B 4 | 2431 A 6 | 2468 B 5 | 2485 B 3 | 2524 A 3 | 3018 B 7 | 3120 C 8 | 3228 B 9 | 3269 A 9 | 3302 C 8 | 3382 C 4 | 3432 A 6 | 3483 A 4 | 4500 C 7 | 6100 C 8 | 7002 |
| 1103 C 6 | 1303 A 2 | 1407 A 6 | 2017 B 7 | 2036 A 7 | 2110 C 9 | 2214 C 9 | 2243 B 9 | 2300 C 5 | 2351 A 7 | 2398 C 5 | 2432 A 5 | 2469 B 5 | 2486 B 2 | 2525 C 2 | 3019 C 8 | 3153 C 7 | 3230 B 9 | 3280 A 9 | 3303 C 7 | 3384 C 5 | 3436 A 6 | 3485 A 3 | 5100 C 8 | 6150 C 6 | 7003 |
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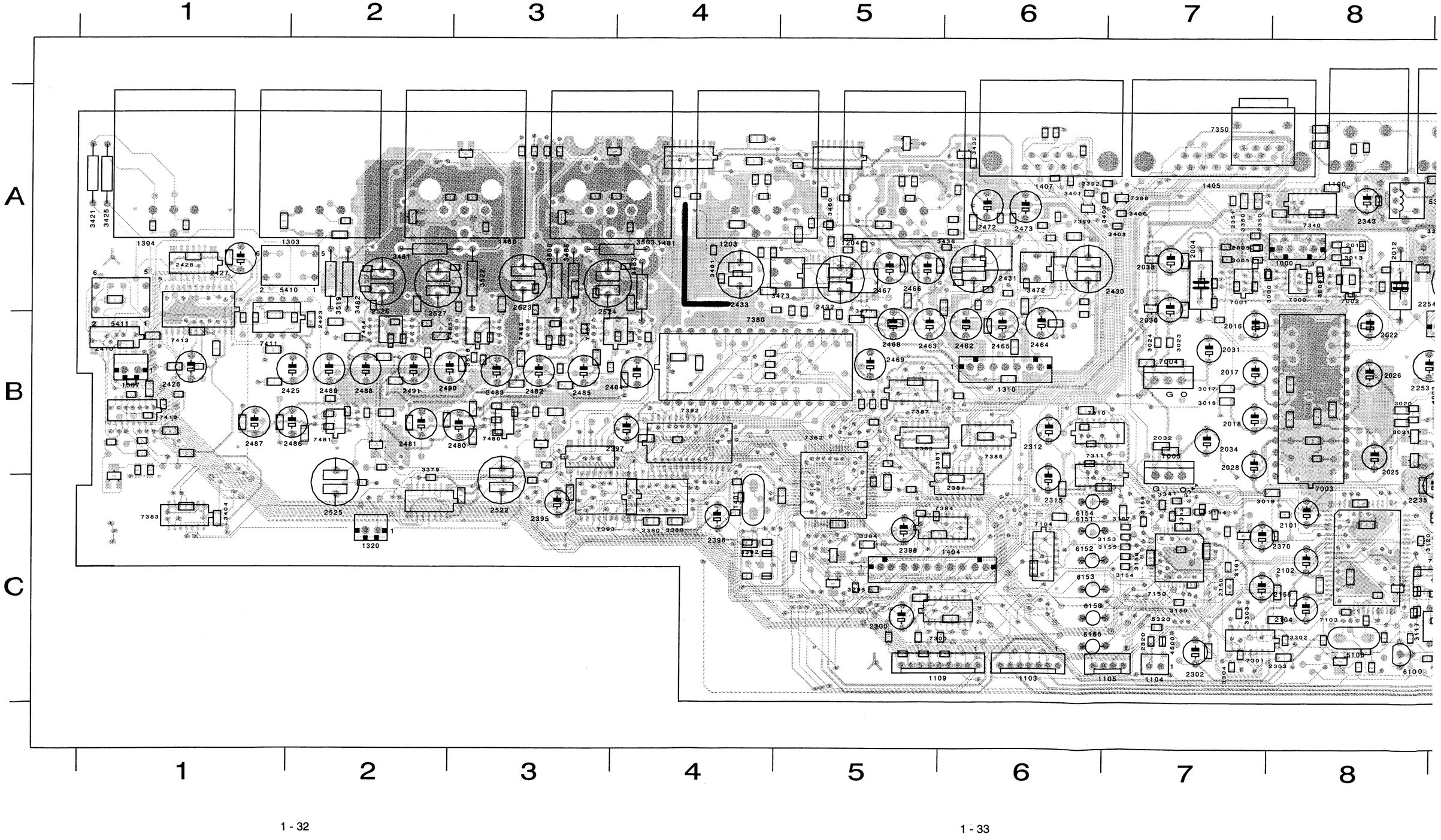

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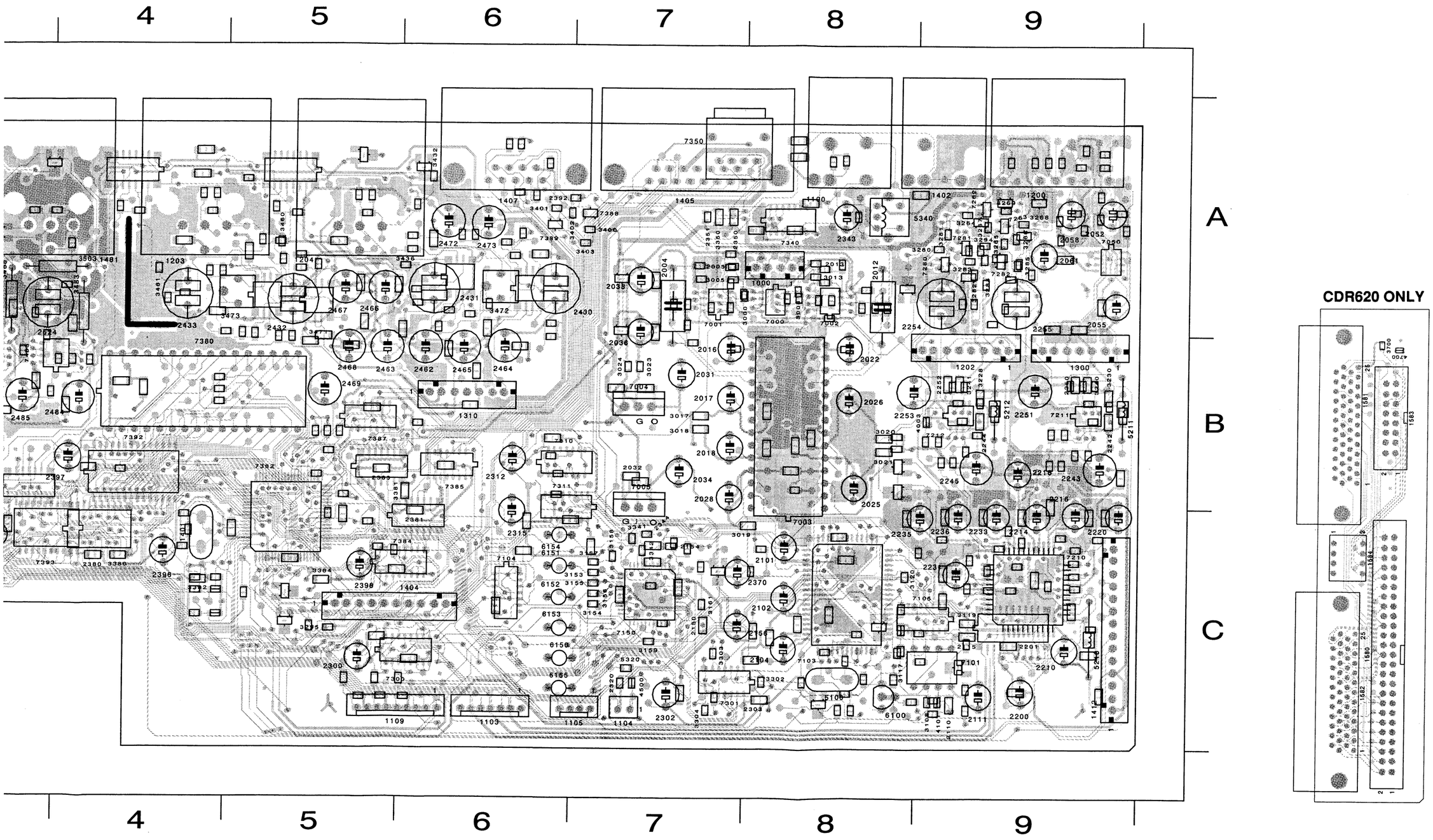

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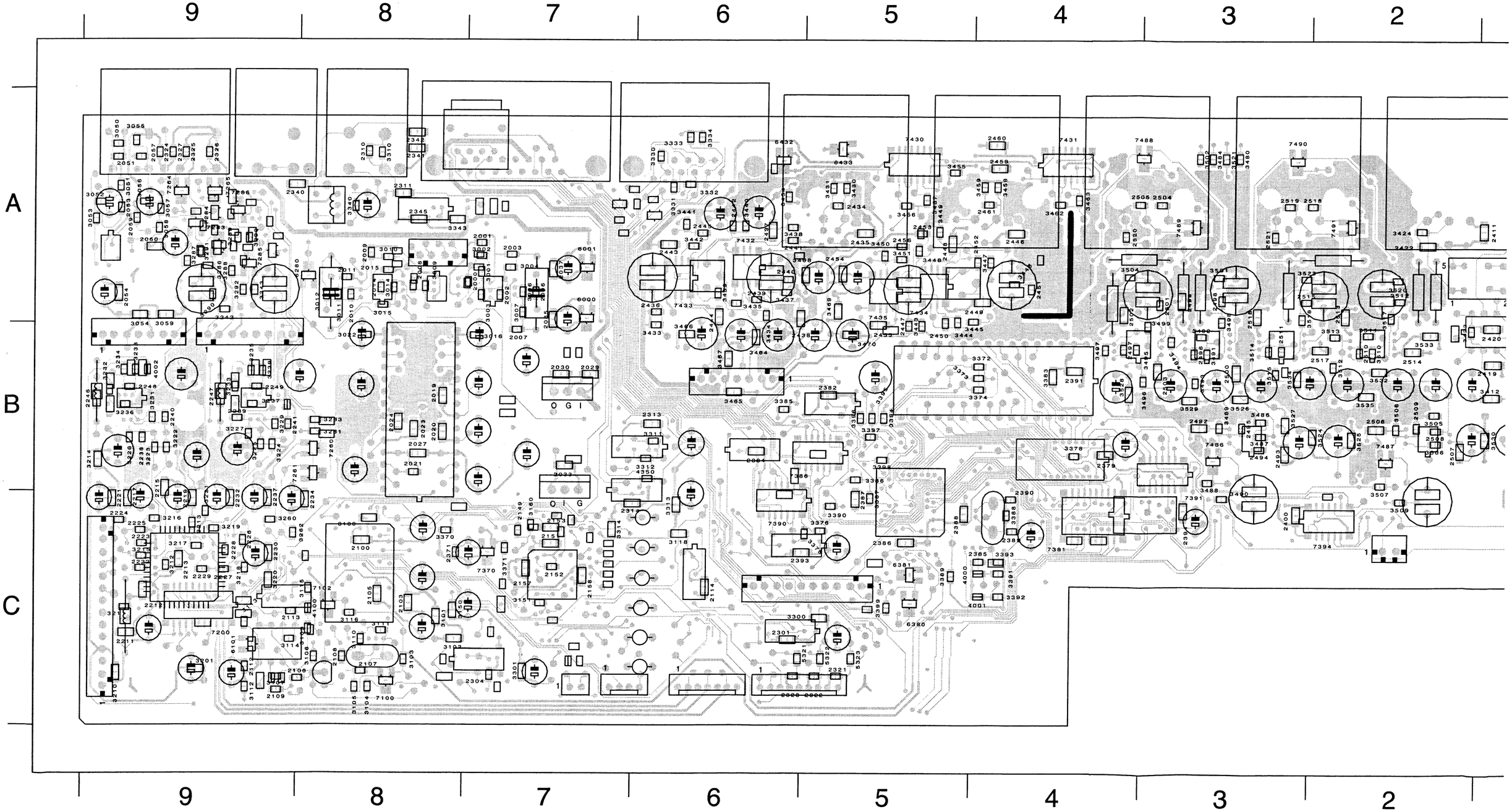

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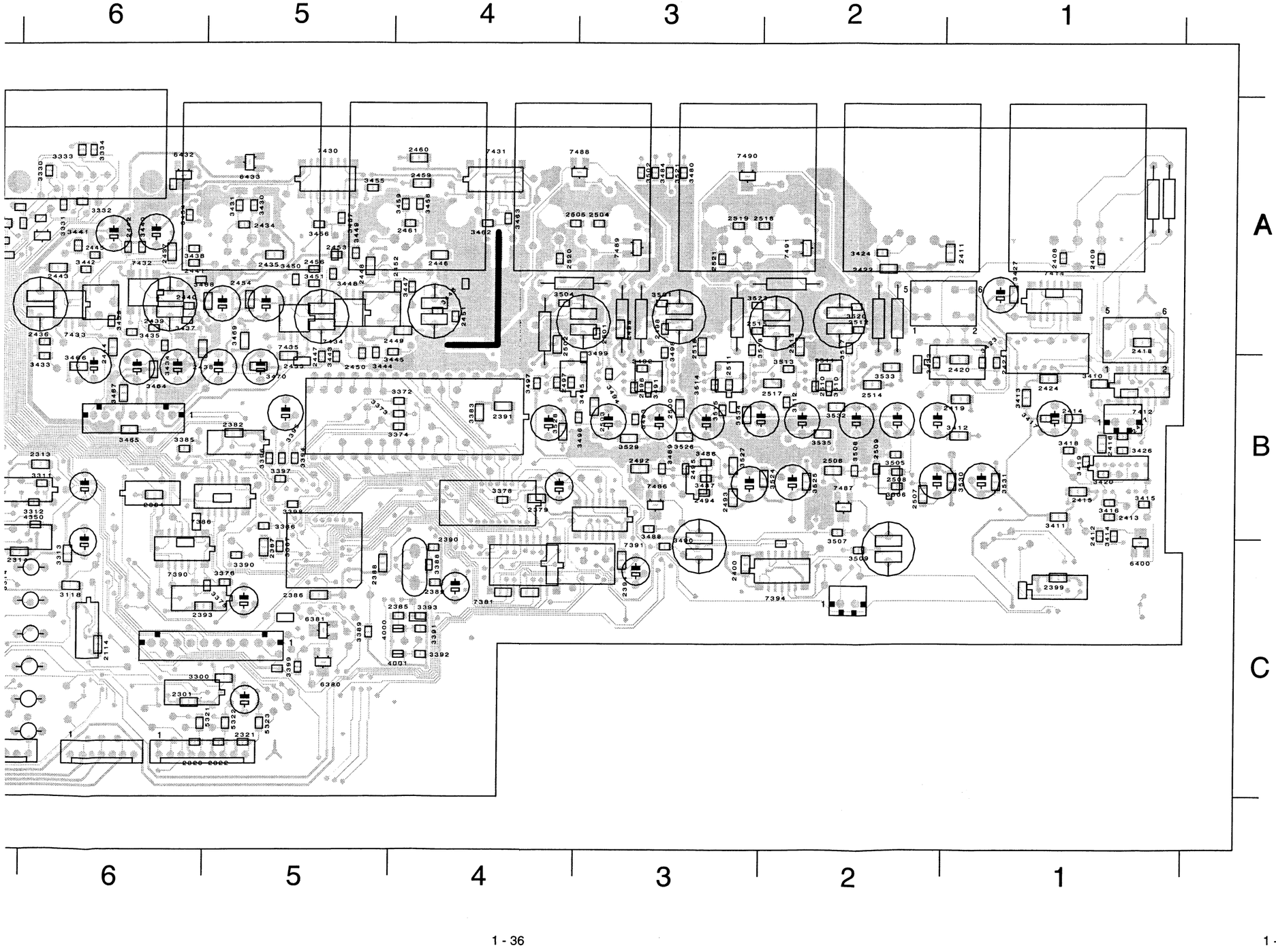


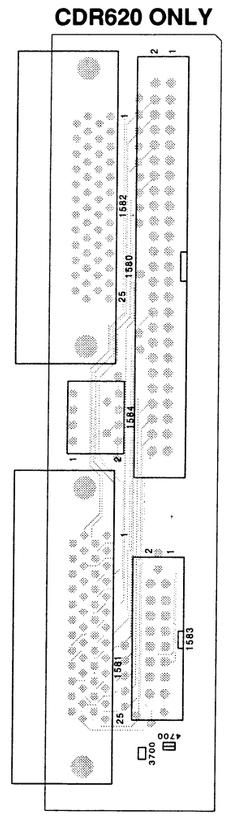

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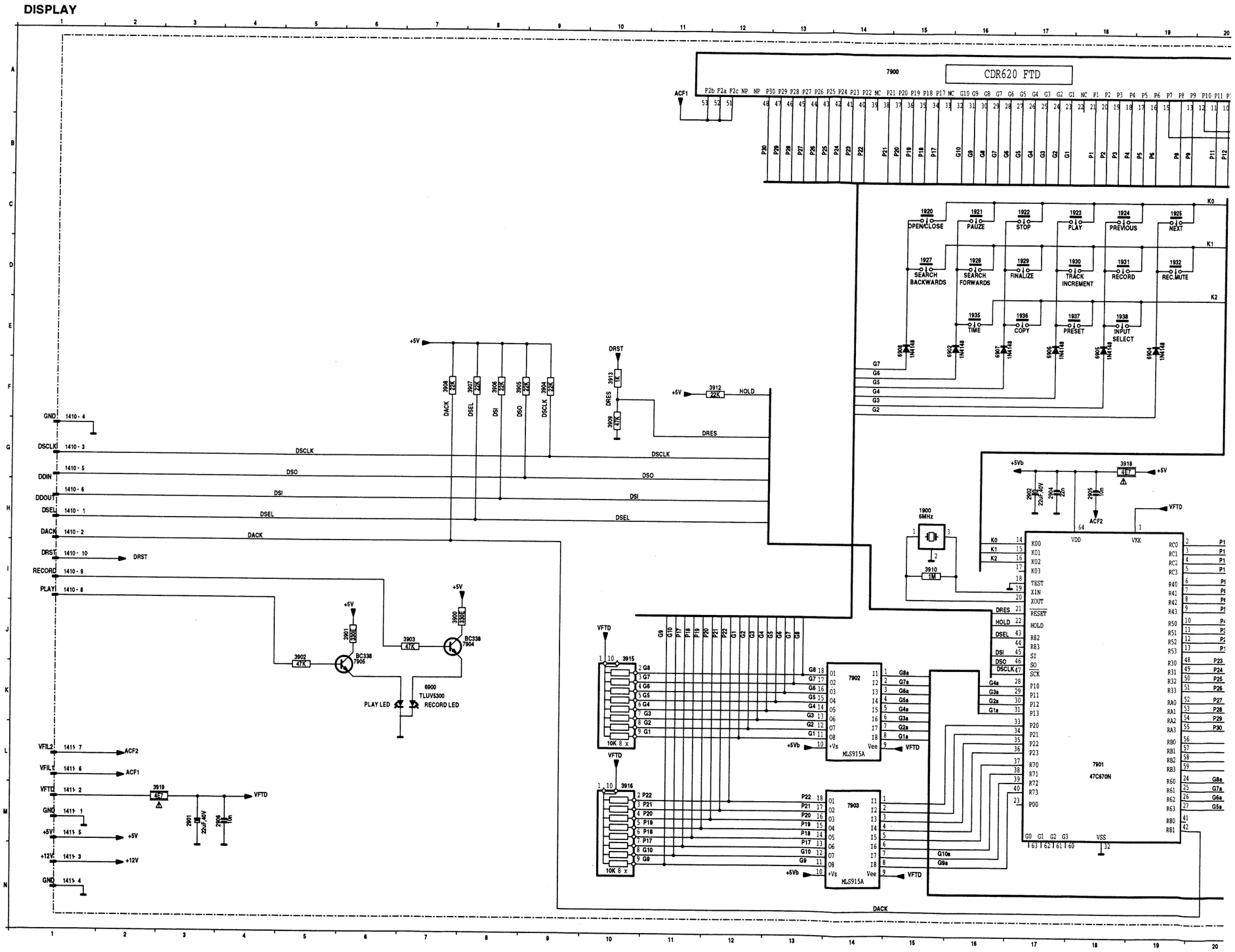
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G6
G5
G4
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G2
+5V
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DRST
3913 1K DRES
3909 47K
+5V
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DSCLK 1410 - 3
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DSEL 1410 - 1
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DRST 1410 - 10
RECORD 1410 - 9
PLAY 1410 - 8
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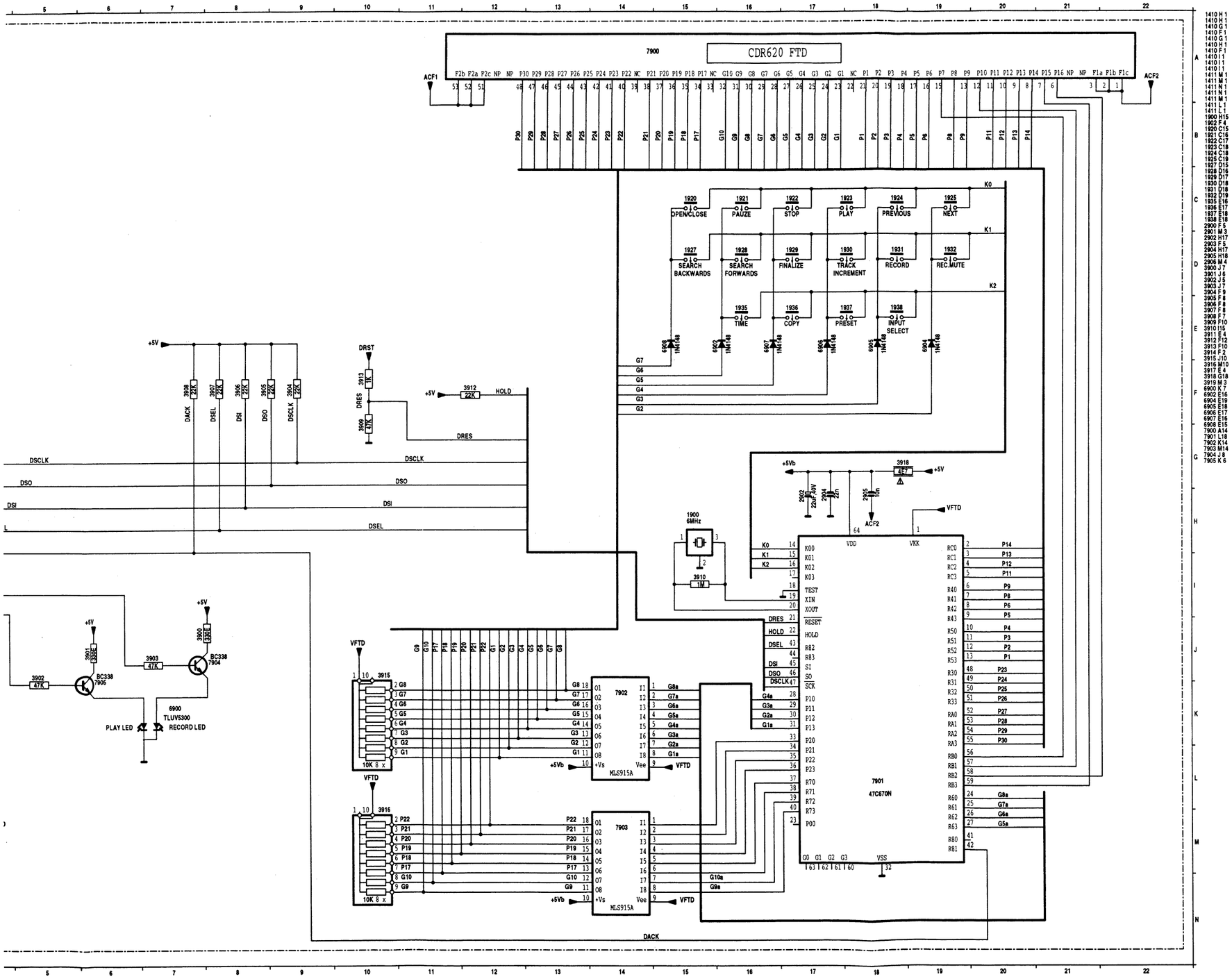
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## DISPLAY BOARD

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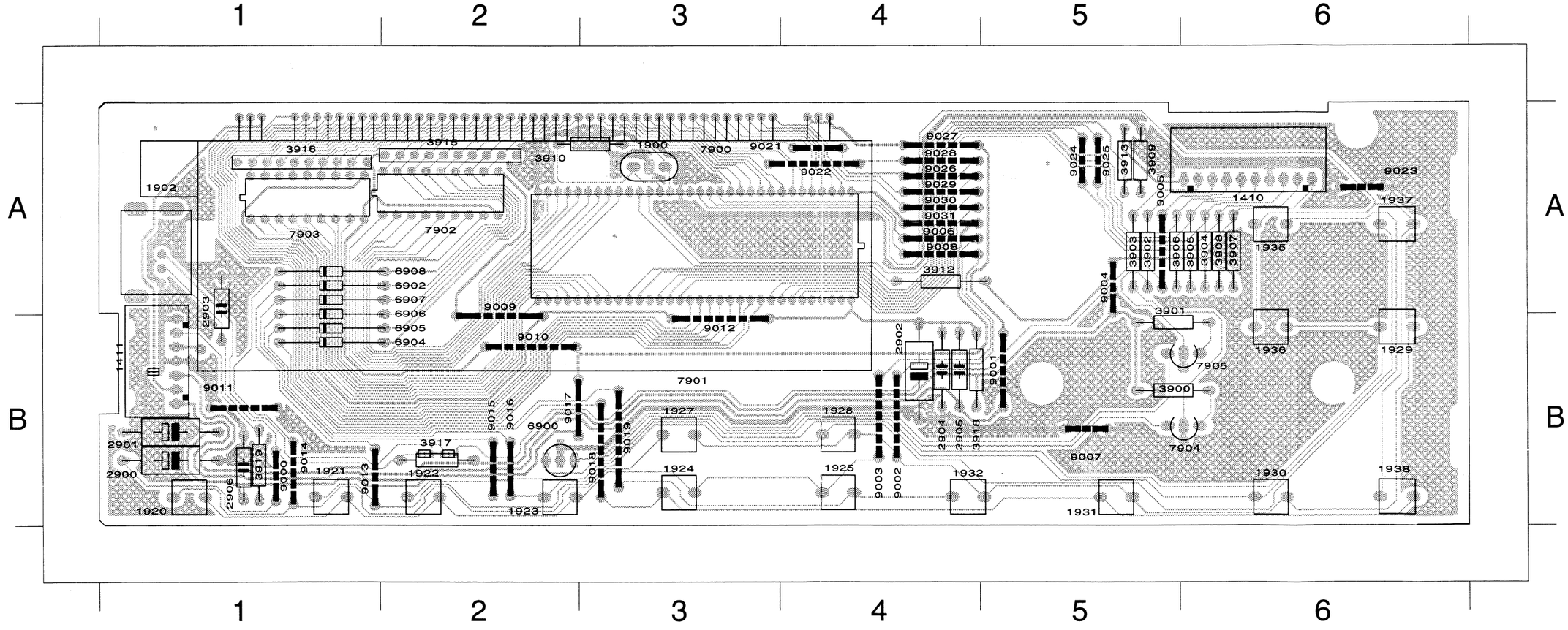

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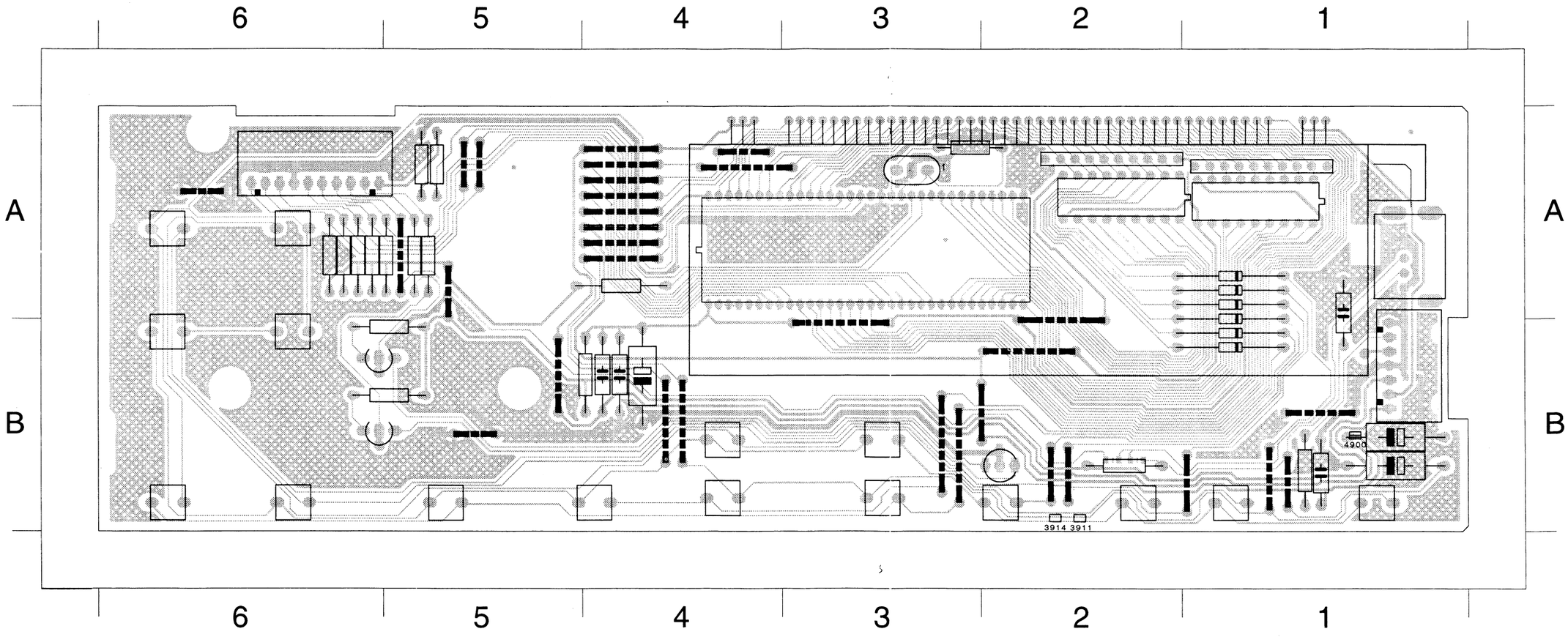
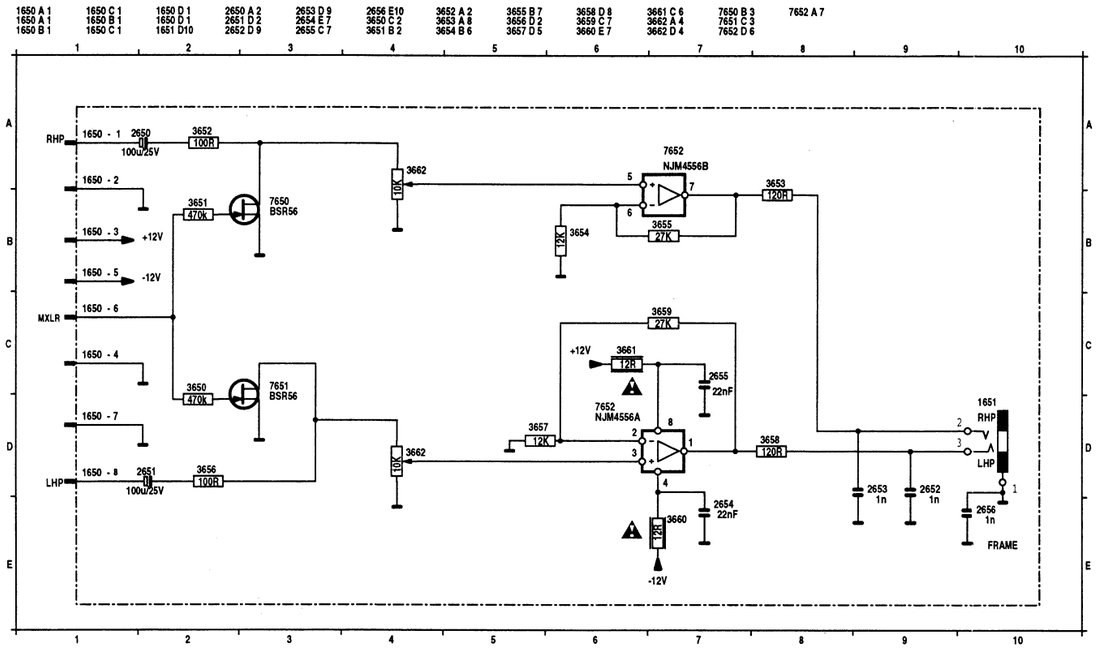
## SOLDER SIDE

3911 B 2  3914 B 2  4900 B 1



## HEADPHONE

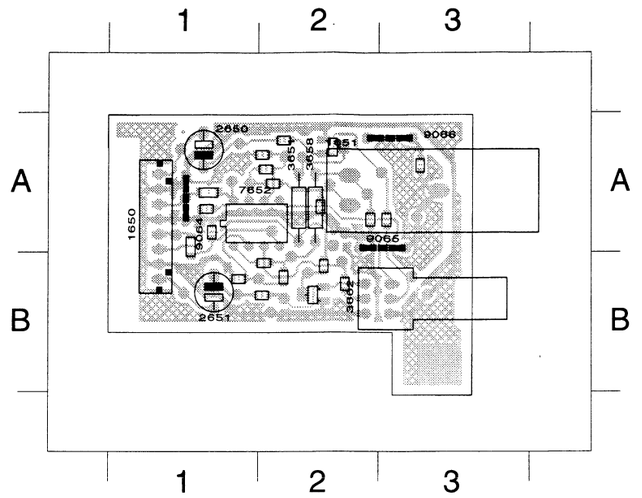





## HEAD PHONE BOARD

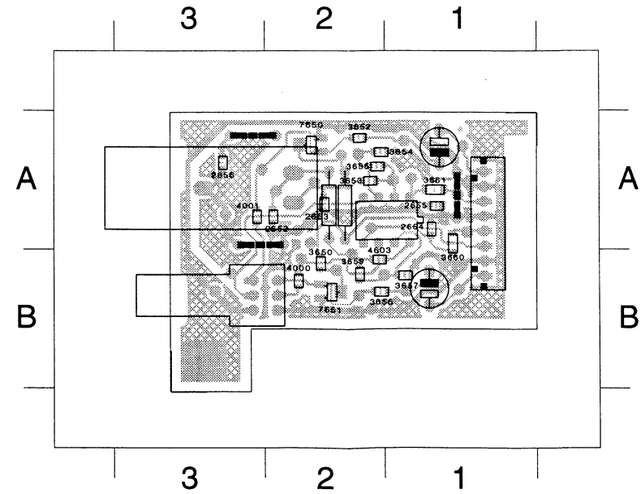
### COMPONENT SIDE

1650 A 1 2650 A 1 3651 A 2 3662 B 2 9064 A 1 9066 A 3
1651 A 3 2651 B 1 3658 A 2 7652 A 1 9065 A 3

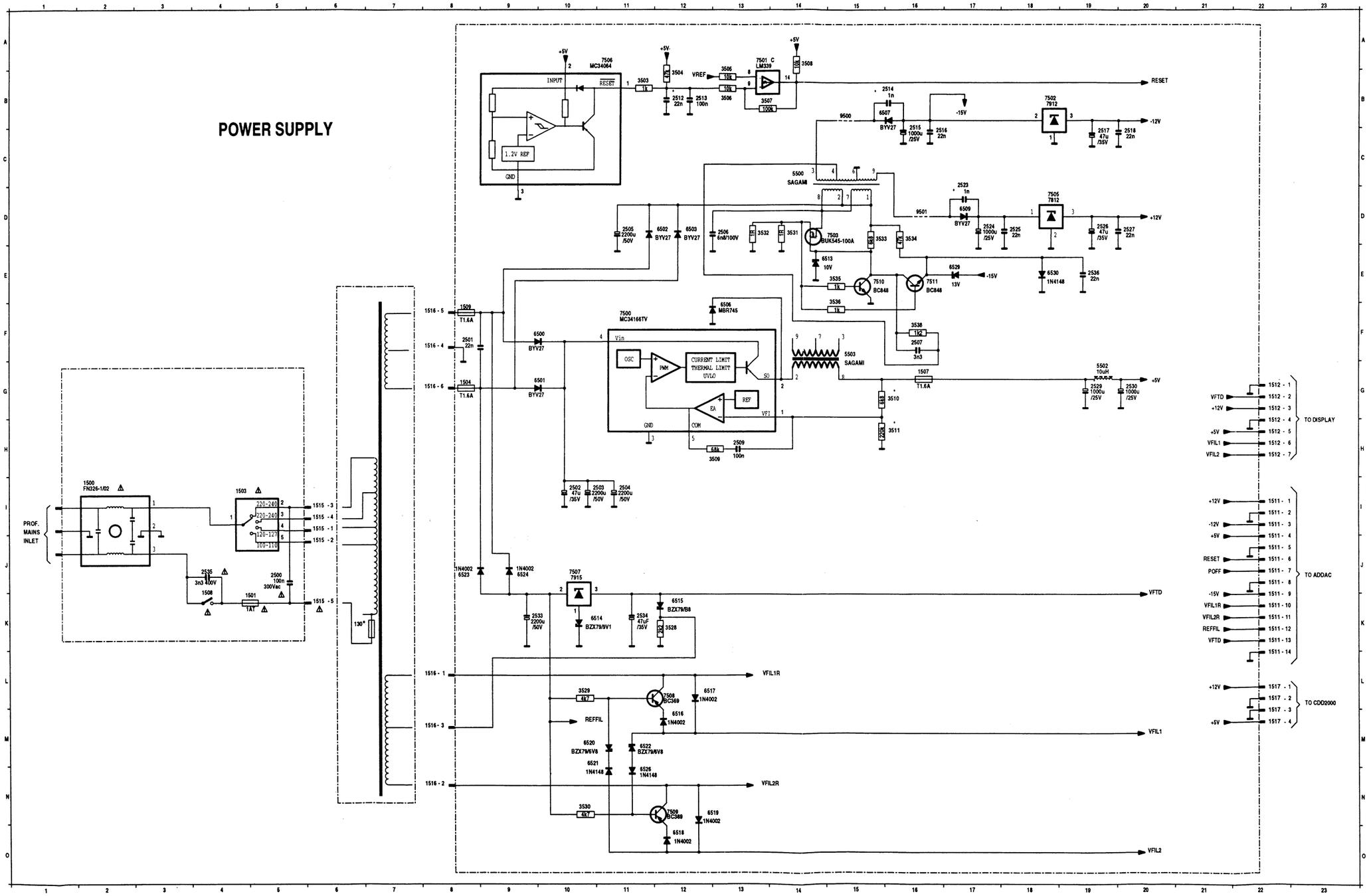



### SOLDER SIDE

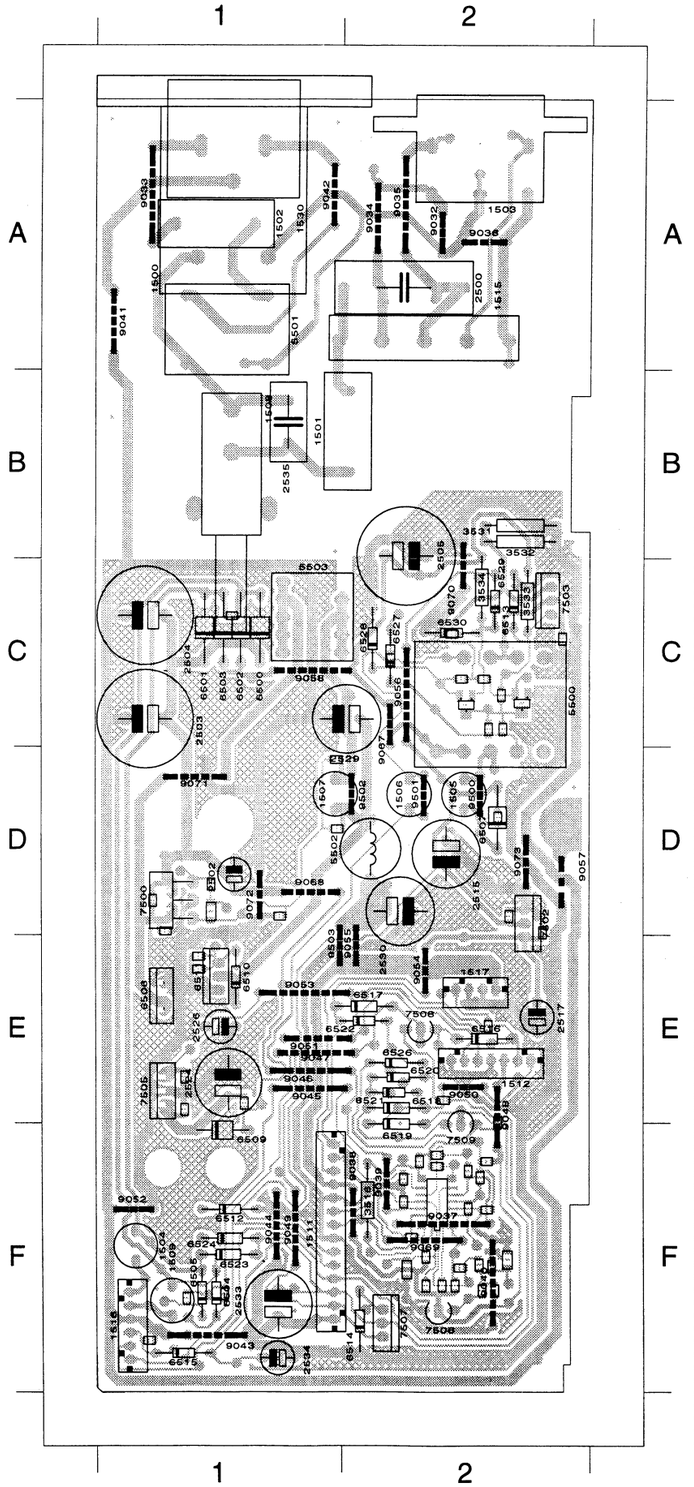
2652 A 2 2655 A 1 3652 A 2 3655 A 2 3659 B 2 4000 B 2 7650 A 2
2653 A 2 2656 A 3 3653 A 2 3656 B 2 3660 A 1 4001 A 3 7651 B 2
2654 A 1 3650 B 2 3654 A 2 3657 B 1 3661 A 1 4603 B 2



# POWER SUPPLY

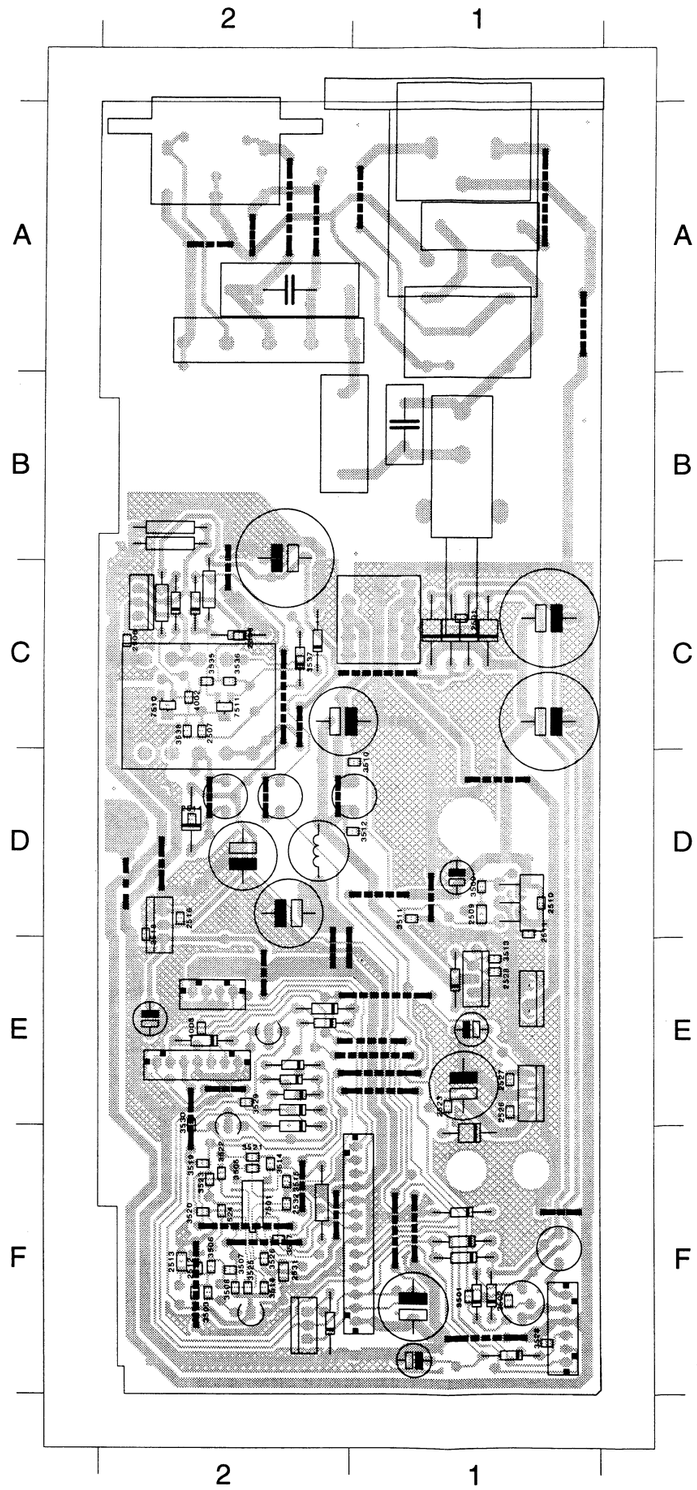


## POWER SUPPLY BOARD
## COMPONENT SIDE

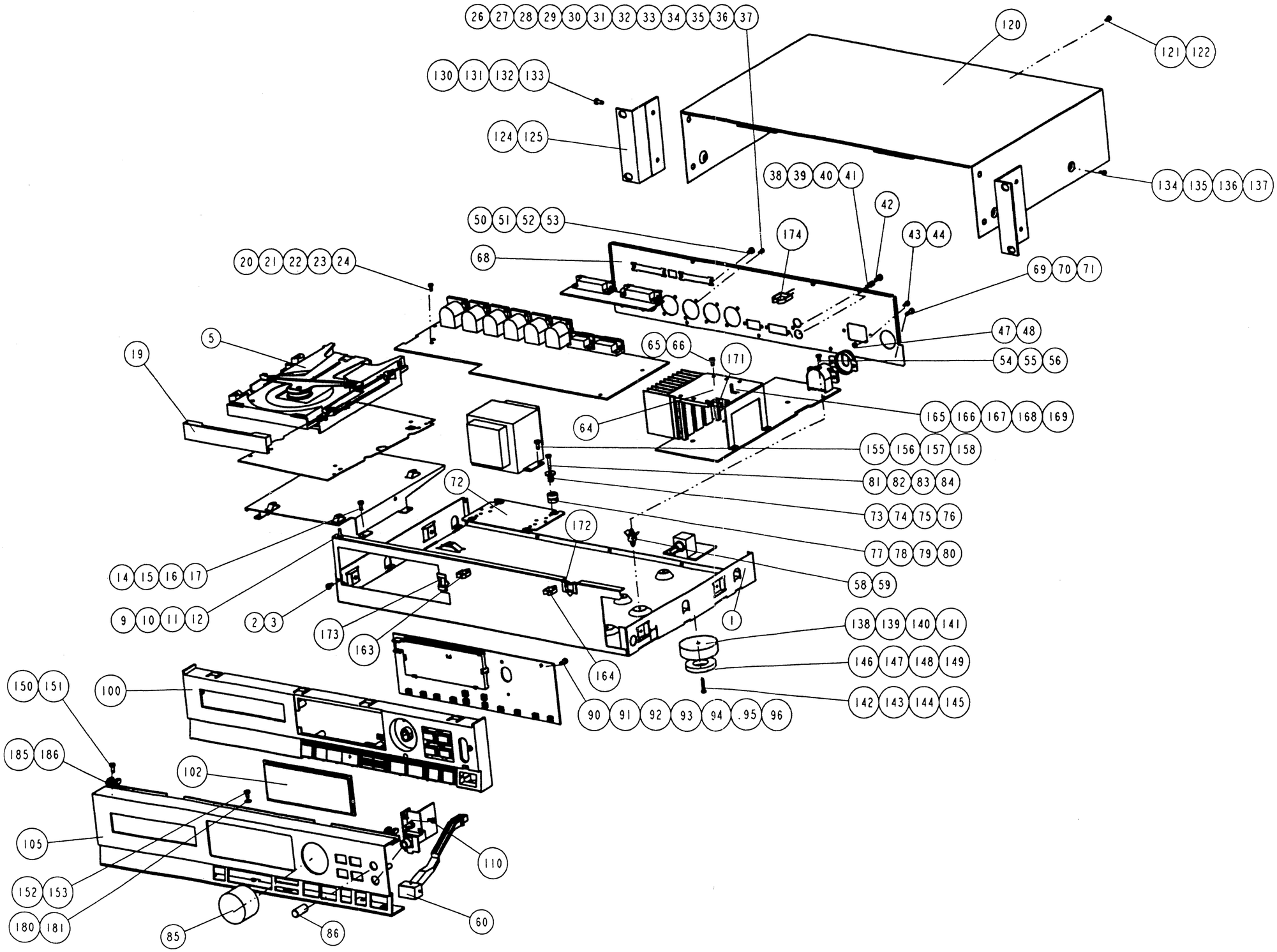





## SOLDER SIDE



## 1.7 EXPLODED VIEW AND PARTS LIST



(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 19 | /02B /06B | 4822 459 04002 | TRAY FRONT |
| 19 | /02M | 4822 459 04098 | TRAY FRONT |
| 50 | | 4822 502 13952 | M 2 X 6T/PAN<STNI |
| 51 | | 4822 502 13952 | M 2 X 6T/PAN<STNI |
| 52 | | 4822 502 13952 | M 2 X 6T/PAN<STNI |
| 53 | | 4822 502 13952 | M 2 X 6T/PAN<STNI |
| 60 | /02B /06B | 4822 535 10245 | POWER ROD |
| 60 | /02M | 4822 535 10246 | POWER ROD |
| 63 | | 4822 256 10138 | FTD HOLDER |
| 64 | | 4822 502 30303 | 2.9X 6.5PANF<STZNBK |
| 65 | | 4822 502 30303 | 2.9X 6.5PANF<STZNBK |
| 66 | | 4822 502 30303 | 2.9X 6.5PANF<STZNBK |
| 65 | | 4822 502 30303 | 2.9X 6.5PANF<STZNBK |
| ▲ 66 | | 4822 492 63076 | SPRING |
| ▲ 67 | | 4822 492 63076 | SPRING |
| ▲ 68 | | 4822 492 63076 | SPRING |
| 85 | /02B /06B | 4822 410 10117 | LEVEL KNOB |
| 85 | /02M | 4822 410 10291 | LEVEL KNOB |
| 86 | /02B /06B | 4822 410 10118 | VOLUME KNOB |
| 86 | /02M | 4822 410 10292 | VOLUME KNOB |
| 100 | /02B /06B | 4822 459 03999 | PLASTIC FRONT ASSY |
| 100 | /02M | 4822 459 04099 | PLASTIC FRONT ASSY |
| 102 | | 4822 450 10054 | WINDOW |
| 105 | /02B /06B | 4822 459 04001 | ALU FRONT ASSY **(CDR620)** |
| 105 | /02B /06B | 4822 459 04138 | ALU FRONT ASSY **(CDR615)** |
| 105 | /02M | 4822 459 04101 | ALU FRONT ASSY **(CDR620)** |
| 105 | /02M | 4822 459 04139 | ALU FRONT ASSY **(CDR615)** |
| 120 | /02B /06B | 4822 442 00004 | COVER ASSY |
| 120 | /02M | 4822 442 00145 | COVER ASSY |
| 124 | /02B /06B | 4822 402 10041 | BRACKET |
| 124 | /02M | 4822 402 10152 | BRACKET |
| 125 | /02B /06B | 4822 402 10041 | BRACKET |
| 125 | /02M | 4822 402 10152 | BRACKET |
| 138 | /02B /06B | 4822 462 41715 | FOOT |
| 138 | /02M | 4822 462 41992 | FOOT |
| 139 | /02B /06B | 4822 462 41715 | FOOT |
| 139 | /02M | 4822 462 41992 | FOOT |
| 140 | /02B /06B | 4822 462 41715 | FOOT |
| 140 | /02M | 4822 462 41992 | FOOT |
| 141 | /02B /06B | 4822 462 41715 | FOOT |
| 141 | /02M | 4822 462 41992 | FOOT |
| ▲ 146 | /02B /06B | 4822 466 93071 | FELT |
| 146 | /02M | 4822 462 40409 | FELT |
| ▲ 147 | /02B /06B | 4822 466 93071 | FELT |
| 147 | /02M | 4822 462 40409 | FELT |
| ▲ 148 | /02B /06B | 4822 466 93071 | FELT |
| 148 | /02M | 4822 462 40409 | FELT |
| ▲ 149 | /02B /06B | 4822 466 93071 | FELT |
| 149 | /02M | 4822 462 40409 | FELT |
| 160 | | 4822 381 11654 | LENS |
| 180 | | 4822 530 80263 | EXT 3.2SERRSTZNBK |
| ▲ 301 | /02B /02M | 4822 321 10741 | MAINS CORD /02M |
| ▲ 301 | /06B | 4822 321 10746 | MAINS CORD /06B |
| ▲ 301 | F | ZC01501020 | MAINS CORD (JPN) |
| 309 | /02B /02M | 4822 736 14081 | USER MANUAL(EU) **(CDR620)** |
| 309 | /02B /02M | 4822 736 14258 | USER MANUAL(EU) **(CDR615)** |
| 309 | /06B | 4822 736 14082 | USER MANUAL(USA) **(CDR620)** |
| 309 | /06B | 4822 736 14262 | USER MANUAL(USA) **(CDR615)** |
| 309 | F | 316K851110 | USER MANUAL(JPN) |

## 1.8 CIRCUIT DESCRIPTION

## 1.8.1 SERVICE PRESCRIPTION

## 1. GENERAL DESCRIPTION

### 1.1 INTRODUCTION

This document describes the service of the CDR620 /CDR615.
Service of the CDR620/CDR615 can be divided into two parts:
- Servicing the CDR-Module (for Marantz)
- Servicing the CDR620 /CDR615-User (Monoboard)

## 2. SERVICE OF THE CDR620 / CDR615 -MODULE

All repairs to this are to be done by a Central Repair Station only.
Servicing the CDR-Module can be handled into two ways:
- Via SCSI
  - This means that you must connect a PC To the SCSI connector.
- Via RS232
  - This is possible with a Connection PCB (RS232 converter)
  - Also her you must connect a PC to this PCB.

### 2.1 SERVICE THE CDR-MODULE VIA SCSI

In this service mode the user can set the player in SCSI-mode by means of the preset feature.
All servicing requests can be given via the SCSI-interface.
For a detailed description of all commands refer to the document:
- SCSI command set CDD2000 V2.01 November 1995

-The CDR-Module always starts-up with SCSI-interface enabled.

When the CDR620/CDR615-User is connected to the CDR-Module the SCSI-OFF command
will be transferred to the CDR-Module. So, for keeping the CDR-Module into SCSI-
mode two possible solutions can be handled:

-Disconnect CDR620/CDR615-User
-The following strategy should be followed:
- Power off the CDR620/CDR615 set.
- Disconnect CDR620/CDR615-User from CDR-Module.
  - 1 cables
    - pos. 1109 of the CDR620/CDR615-User.
- Power on the CDR620/CDR615.
- Wait now for 3 seconds.
- Now the user can issue all service commands via SCSI.
- How to use the service commands ?
  - Their is no difference between the CDR620/ CDR615 and CDD2000 module.
  - Only the audio part is deleted from the PCB. This has no impact for servicing the CDR620/ CDR615-Module.
  - All SCSI command will be the same except the play audio command.
  - Audio via SCSI is 4x Fs Sony format. (12S)
  - Audio in our set is this FS Philips format. (12S)

### 2.2 HOW TO USE THE WRIBASS.EXE TOOL.

- This is a program that convert the SCSI command set into a user interface.
  - We will use this program in the service course.
- You can use this program for setting manual command.
  - Stop command
  - Start command
  - Diagnostic.....and more.

- You can run also a automatically routine made on this basic program.
  - How to run this program ?
    - Start the main program with b.bat
    - select test (6)
    - Press the key F1 or the key that is displayed in the window.
  - The following routine will be done:
    -write a track of 500 blocks at speed = 1
    -opec/close (update PMA program memory area)
    -write a track of 500 blocks at speed = 2
    -open/close (update PMA)
    -reserve a track at 500 blocks
    -open/close (update PMA)
    -Read first and second track at speed = 1 (APV auto pattern verify)
    -open/close
    -Read first and second track at speed = 2 (APV)
    -open/close
    -full-up the reserve track.
    -open/close (update PMA)
    -Read first, second and third track at speed = 4 (APV)

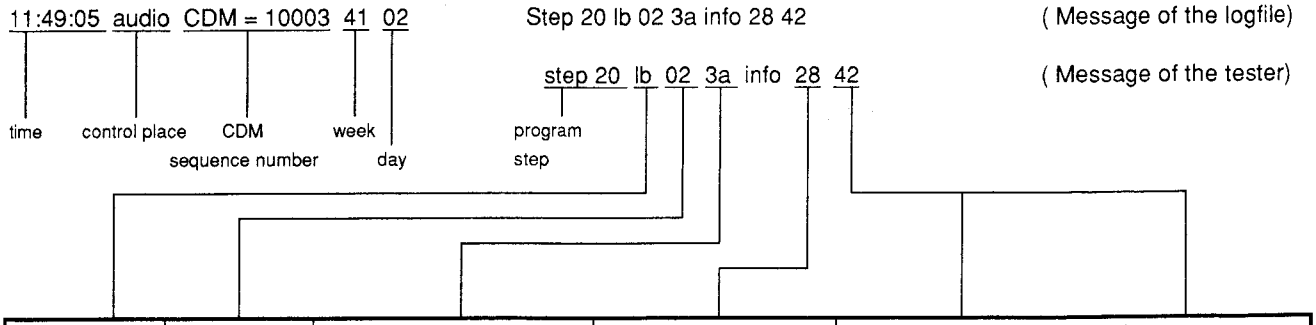
  - All this command will be logged in a log-file.
    - You can find the log-file in the directory you start-up your main program.
  - A explanation of the error handling you can find on the next page.
    -This is for internal use only.

## [ REMARK ]

CDR615 is available to use in the SCSI mode and CDR620's service procedure by replacement of the EP-ROM (7380) on the MONO Board PCB. The part number of that CDR620 EP-ROM is **4822 900 10974**. CDR615 should become same as CDR620 by this modification except some function which depend on hardware structure.

## 2.2.1 ERROR HANDLING

What means what in production tests ?




| Command | Sense message | Additional sense message | Infobyte 1 (basic) | Infobyte 2 (servo) | |
|---|---|---|---|---|---|
| 00 Test unit ready | 00 No sense | 00 No sense | 00 No error | 00 ready | 40 NO error |
| 01 Rezero unit | 01 Recovered error | 03 Tray out | 01 interface command timeout | 01 busy | 41 startup error |
| 03 Request sense | 02 Not ready | 04 Drive not ready | 02 interface group busy | 02 illegal request | 42 startup no disc |
| 08 Read | 03 Medium error | 08 Communication failure | 03 interface invalid precondition | 03 dma error | 43 startup disk present error |
| 0a Write | 04 Hardware error | 09 Track following error | 04 interface invalid request id | 04 not ready tray out | 44 read to leadin error |
| 0b Seek | 05 Illegal request | 11 Unrecovered read error | 05 interface no error info | 05 not ready tray in | 45 jump to leadin error |
| 12 inquiry | 06 Unit attention | 15 Positioning error | 10 communication | 06 command sequence error | 46 read toc timeout |
| 15 Mode select | 07 ??? | 17 Recovered read data with retries | 15 communication range check | 07 dsp load error | 47 read atip timeout |
| 16 Reserve | 08 Blank check | 18 Recovered read with ECC correction | 16 command not accepted | 08 illegal medium | 48 read pma error |
| 17 Release | 09 Vendor specific | 1a Parameter list length error | 17 communication timeout | 09 tray locked | 49 jump to pma error |
| 18 copy | 0a ??? | 1b Drive error | 18 communication checksum | 0a tray opening error | 4a incorrect track in pma |
| 1a Mode sense | 0b Aborted command | 1c Controller error | 1a communication max driver error | 0b ready tray in | 4b incorrect end of pma |
| 1b Start/Stop | 0c Miscompare | 1d Selftest failed | 1b communication max BR | 0c selftest error | 4c read pma timeout |
| 1c Receive diagnostic | 0d Volume overflow | 20 Invalid command | 20 servo | 0d illegal address | 4d jump to last volume error |
| 1d Send diagnostic | 13 APV data error | 21 Invalid block address | 22 off track | 0e illegal track number | 4e jump to last volume timeout |
| 1e Allow/prevent | | 24 Illegal field in CDB | 23 servo disc speed | 0f illegal offset | 4f read last volume error |
| 25 Read CDROM cap | | 25 Invalid LUN | 24 write eeprom overrun | 10 illegal length | 50 jump to last recorded add error |
| 28 read long | | 26 Invalid field parameter list | 25 servo sledge | 11 tray closing error | 51 jump to first track error |
| 2a Write long | | 28 Medium changed | 26 servo radial skating | 12 no pma update needed | 60 read jump error |
| 2b Seek long | | 29 Power/Bus reset occurred | 27 servo radial lost | 13 wrong disc id | 61 wrong size before read |
| 2f Verify | | 2a Unit attention | 28 servo focus | 14 opc area almost full | 62 wrong size during read |
| 35 Flush cache | | 2c Command sequence error | 30 player | 15 pma is full | 63 erroneous data received |
| 3b Write buffer | | 30 Cannot read medium format unknown | 33 player record power low warning | 16 disc is write protected | 64 incorrect headder address |
| 3c Read buffer | | 31 Medium format corrupted | 34 player record sync warning | 17 wrong application code | 65 read error |
| 42 Read Sub channel | | 33 Monitor ATIP error | 35 player record power limit warning | 18 illegal block size for write | 66 motor not ready error |
| 43 Read disk info | | 34 Absorption control error | 36 player window | 19 disc is full | 67 link blocks encountered |
| 45 Play audio | | 3a Medium not present | 37 player link | 1a not writable track | 68 read subcode timeout |
| 47 Play audio MSF | | 3d bits in identify message | 38 player access | 1b audio in res track not allowed | 69 incorrect link area |
| 48 Play audio t/i | | 40 Diagnostic failure | 40 opc | 1c raw data in res track not allowed | 6a link area expected |
| 4b Pause/Resume | | 42 Power on selftest failure | 41 opc alpha power range | 1d wrong mix mode | 6b incorrect logical address |
| 55 Mode select long | | 44 Internal controller error | 42 opc alpha lower range | 1e subheaders expected | 6c read address not found |
| 5a Mode sense long | | 47 SCSI parity error | 43 opc alpha upper range | 1f wrong submode form | 6d read no efm found |
| d2 Read OPC info | | 50 Write append error | 44 opc beta lower range | 20 illegal session number | 6e read no headder sync found |
| d3 Write OPC info | | 53 Medium load or eject failed | 45 opc beta upper range | 21 end of user area encountered | 6f read start address not found |
| e2 First writable add | | 57 Unable to read TOC. PMA or Subcode | 46 opc modulation range | 22 read with retries | 80 initialize pma error |
| e3 Format track | | 5a Operator medium removal request | 47 opc power range | 23 read with ecc correction | 81 write pma error |
| e4 Reserve | | 63 End of user area encount on track | 48 opc count area full | 24 unrecovered read error | 82 absorption error |
| e5 Read track info | | 64 Illegal mode for this track | 50 discinfo | 25 invalid block size for read | 83 write track error |
| e6 Write track | | 65 Verify failed | 56 discinfo disc sync | 26 buffer underrun | 88 initialize write leadin error |
| e7 Load/Unload | | 81 Illegal track | 57 discinfo atib timeout | 27 dummy blocks added | 89 write leadin error |
| e8 Finish track | | 82 Command now not valid | 58 discinfo subcode timeout | 28 illegal transfer length | 8a initialize write leadout error |
| e9 Fixation | | 83 Medium removal is prevented | f0 unknown | 29 end of medium reached | 8b write leadout error |
| ea Update PMA | | 84 tray open | | 2a current program area empty | 90 seek error |
| eb Send absorb control | | 85 track on disk. not in pma | | 2b not finalized tracks | 91 spinup error |
| ec Recover | | a1 Invalid start-address | | 2c illegal start address | 92 spindown error |
| ed Write session | | a2 Attempt to cross track-boundary | | 2d illegal stop address | a0 audioplay error |
| ee Read session info | | a3 Illegal medium | | 2e illegal start track | a1 illegal mode for audioplay |
| f1 Send service comm | | a4 Disc write-protected | | 2f illegal stop track | a2 track index does not exist |
| f2 Rec service dat | | a5 Application code conflict | | 30 illegal start index | a3 leadout reached during audio |
| fd Reset | | a6 Illegal block-size for command | | 31 illegal stop index | b0 no isrc found |
| fe Write track | | a7 Block-size conflict | | 32 incomplete track exists | b8 no catalog found |
| ff APV | | a8 Illegal transfer length | | 33 track too short | c0 calibrate error |
| | | a9 Request for fixation failed | | 34 verify failed | d0 check track error |
| | | aa End of medium reached | | 35 trk length not mul of packet size | d1 descriptor block timeout |
| | | ab Illegal track number | | 36 wrong mode for incremental write | d2 out of pregap error |
| | | ac Data track length error | | 37 current program area not empty | d3 invalid incomplete track |
| | | ad Buffer under run | | 38 wrong toc mode | d8 verify blank error |
| | | ae Illegal track mode | | 39 parameter list length error | d9 verify blank EFM found |
| | | af Optimum power calibration error | | 3a write session invalid field | da verify blank address not found |
| | | b0 Calibration area almost full | | 3b medium removal requested | |
| | | b1 Current program area empty | | 3c unrecoverable disc | |
| | | b2 No EFM at search address | | 3d immediate ready | |
| | | b3 Link area encountered | | 3e medium not present | |
| | | b4 Calibration area full | | 40 no control error | |
| | | b5 Dummy blocks added | | | |
| | | b6 Block size format conflict | | | |
| | | b7 Current command aborted | | | |
| | | c0 No barcode available | | | |
| | | c1 Barcode reading error | | | |
| | | d0 Recovery needed | | | |
| | | d1 Can't recover from track | | | |
| | | d2 Can't recover from prog mem area | | | |
| | | d3 Can't recover from leadin area | | | |
| | | d4 Can't recover from leadout area | | | |
| | | d5 Can't recover from opc area | | | |
| | | d6 Eeprom failur | | | |

Program Steps:

| selftest + audio + reproduction | Read/write | reproduction (weergave) | audio |
|---|---|---|---|
| 00 : uit burnin | 03 : cdm versie + control cdm | 03 : cdm versie + end control cdm | 03 : cdm versie + end control cdm |
| 01 : reset | 07 : open | 07 : open | 05 : speed > 1 |
| 02 : selftest | 40 : speed > 1 | 30 : start mat weergave plaat N = 1 | 20 : start van sdc444 disk |
| 03 : cdm versie + end control cdm | 41 : start | 31 : lasttr van weergave plaat | 21 : audio volume |
| 04 : test of eprom versie goed is | 42 : reserve track 400 blk | 32 : apv track 1 N = 1 | 22 : audio play track 1 |
| 05 : speed > 1 | 43 : write track 400 | 33 : apv track 3 N = 1 | 23 : audio play track 8 |
| 20 : start van sbc444 disk | 44 : flush | 34 : open | 24 : audio play track 18 |
| 21 : audio volume | 45 : open | 35 : speed > N=2 | 25 : audio play track 14 |
| 22 : audio play track 1 | 46 : speed > 2 | 36 : start N=2 | 26 : audio play track 24 |
| 23 : audio play track 8 | 47 : start | 37 : apv track 1 N = 2 | 60 : open sdc444 |
| 24 : audio play track 18 | 4g : lasttrack | 38 : apv track 3 N = 2 | 61 : start sqew |
| 25 : audio play track 14 | 49 : write reseved track | 39 : open | 27 : audio play track 24 SQEW |
| 26 : audio play track 24 | 4a : flush | 3a : speed > N=4 | 07 : open |
| 60 : open sbc444 | 4b : open | 3b : start N=4 | |
| 61 : start sqew | 4c : speed > 1 | 3c : apv track 1 N = 4 | |
| 27 : audio play track 24 SQEW | 4d : start | 3d : apv track 3 N = 4 | |
| 06 : open met sbc444 of SQEW | 4e : lasttrack | 3e : open | |
| 30 : start met weergave plaat N = 1 | 4f : apv lasttrack | | |
| 31 : lasttr van weergave plaat N = 1 | 50 : apv lasttrack - 1 | | |
| 32 : apv track 1 N = 1 | 51 : speed > 2 | | |
| 33 : apv track 3 N = 1 | 52 : start | | |
| 34 : open | 53 : lasttrack | | |
| 35 : start met weergave plaat N = 2 | 54 : apv lasttrack | | |
| 36 : lasttr van weergave plaat N = 2 | 55 : apv lasttrack - 1 | | |
| 37 : apv track 1 N= 2 | 56 : fixate | | |
| 38 : apv track 3 N = 2 | 57 : speed > 4 | | |
| 39 : open | 58 : start | | |
| 3a : start met weergave plaat N = 4 | 59 : lasttrack | | |
| 3b : lasttr van weergave plaat N = 4 | 5a : apv lanttrack | | |
| 3c : apv track 1 N = 4 | 5b : apv lasttrack - 1 | | Restart voor 28 42 |
| 3d : apv track 3 N = 4 | | | 71 : Open bij restart |
| 3e : open | | | 72 : Start bij restart |

## 3. SERVICE OF THE CDR620/CDR615-USER

- The CDR620/CDR615-User can be set into service mode in two ways:
  - Via RS232
  - Via Keyboard of apparatus

- A service command within service mode is testing of the EEPROM. This testing will be handled in the following way:
  - Read contents of EEPROM-location.
  - Write $FF to the EEPROM location.
  - Read EEPROM location
  - If written and read data are equal
  - Then
    - Restore contents of EEPROM location.
    - Point to next EEPROM-location.
  - Else
    - Show the next `EEP ERR' in the display.
    - Stop testing EEPROM.

## 3.1 SERVICING CDR620/CDR615-USER VIA RS232

- The user can connect a PC or a special testboard to the SCI-Bus. When a PC is used a special RS232-to-TTL converter board should be used.
- The following procedure should be followed for servicing the CDR620/CDR615-User:
  - Power -off the CDR620/CDR615.
  - Disconnect the wires between the CDR620/CDR615-User and the CDR-Module.
  - Connect the special RS232-to-TTL converter.
  - Power -on the CDR620/CDR615.
- The user can put the CDR620/CDR615-User into service mode by transferring the command `SERVICE ON' over the SCI-interface.
- You can send this command by starting-up the SERVICE.EXE program on PC.
- You see now an user interface for setting all SCI -commands.
- When you have send the service-start command the information SERVICE will appear in the display. The CDR620/CDR615-User is now in service mode.

- *Don't forget to connect the two cables (9-pins and 7-pins) to the Mono Board.*
  - *Use the original cables from the CDR-Module.*
  - *Disconnect the power supply from the drive and plug the supply into the converter PCB.*
  - *Connect also the RS232 cables to the PC (COM1 or COM2)*
  - *The default setting for the program is COM1.*
  - *When you use com2 start then the program with SERVICE.EXE /COM2.*

-The following commands you can transferred when the CDR620/CDR615-User is in service mode:

- ResetBoard
  - All IC will get a reset (GDIN,ADMOD,DAIO,NPC,uP)

- Play back mode
  - Unlock goes low.(the board goes into slave mode.)
    - This function will only work if we put an EBU signal to connector pos. 1105.2.
  - This mode is actually not usable for service purpose.

- Record AD-DA mode (Analog recording mode)
  - Unlock is high (Crystal is now in fix. mode +/- 50 PPM)
  - Connect an analog source to the input.
  - With the headphone you can hear the audio input.
    - Also XLR analog out is active.
  - This function give no status message to the display.

- Cinch slave mode
  - Unlock goes low.
  - Connect a CD source to Cinch in.
  - You can hear the audio at the analog output or headphone.
    - Also Cinch and XLR EBU is active.
  - If the board doesn't lock ,the message NO LOCK will appear on display.

- XLR slave mode
  - Unlock goes low.
  - Connect a CD source to XLR in.
    - It doesn't matter of you use a Prof. or Consumer source.
  - You can hear the audio at the analog output or headphone.
    - Also Cinch and XLR EBU is active.
  - If the board doesn't lock ,the message NO LOCK will appear on display.

- Cinch SRC mode (Sample Rate Converter)
  - Unlock goes High
  - Connect a digital source from 32khz to 5Okhz to the Cinch input.
  - You can hear the audio at the analog output or headphone.
    - Also Cinch and XLR EBU is active.
  - If the board doesn't lock ,the message NO LOCK will appear on display.

- XLR SRC mode
  - Unlock goes High
  - Connect a digital source from 32kHz to 50kHz to the XLR input.
  - You can hear the audio at the analog output or headphone.
    - Also Cinch and XLR EBU is active.
  - If the board doesn't lock ,the message NO LOCK will appear on display.

- Toggle Cascade mode
  - This has only affect on the Digital XLR in- and output.
  - The Frequency output will be total the same as the output.
  - You can hear the audio at the analog output or headphone.
    - Also Cinch EBU is active.

- Toggle Deemphasis
  - The board goes now in analog recording mode.
  - With this setting the Deemphasis will be active at the analog output
    - Also the digital outputs will switch.
  - You can hear the audio at the analog output or headphorie.
    - Also Cinch and XLR EBU is active.

- Toggle impedance switch
  - This switch the XLR analog input from +4dbu to -10dbu.
  - This board goes in analog recording mode.
  - You can hear the audio at the analog output or headphone.
    - Also Cinch and XLR EBU is active.

- Eprom test
  - This will test the EEPROM

- EEPROM Clear
  - Clear the internal eeprom

- ROM-Version
  - Show the ROM-version number of the CDR620/CDR615-User.

- The command `SERVICE.OFF' is the command to leave the service mode and the CDR620/CDR615-User will continue in normal mode.

## 3.2 SERVICING CDR620/CDR615-USER VIA KEYBOARD

- The following procedure should be done to set the CDR620/CDR615-User in service mode:
  - power Off the CDR620/CDR615.
  - Disconnect the wired remote.
  - Press simultaneous the RECORD- and RECORD MUTE key. And wait 15sec or more for initialize of service mode.

- The display shows the text `SERVICE' in the digits. This indicates that the CDR620/CDR615-User is in service mode.

- The following keys are used to execute an additional service command:

| | |
|---|---|
| RECORD-key | Show ROM-version of the CDR620/CDR615-User. This key is only valid after starting up in service mode. |
| STOP-key | Service off (leaving service mode) |
| OPEN/CLOSE-key | Reset Board |
| PLAY-key | Playback mode |
| Pause-key | AD-DA recording mode. |
| TRACK INC-key | Slave Cinch mode. |
| NEXT-key | Slave XLR mode. |
| PREVIOUS-key | SRC Cinch mode. |
| INPUT-key | SRC XLR mode. |
| Search REVERSE-key | Toggle Cascade mode. |
| Search FORWARD-key | Toggle Deemphasis |
| FINALIZE-key | Toggle impedance switch |
| PRESET-key | Eeprom Test |
| TIME-key | Eeprom reset |
| COPY-key (CDR620) | CDR-Module diagnostic. |
| MONITOR-key (CDR615) | CDR-Module diagnostic. |

## 4. SHOW TEXT FOR SERVICE COMMANDS

- ServiceOn command
  - The display shows the text `SERVICE' in the digits.

- ServiceOff command
  - the display will show that text what will be shown operating in normal mode.

- Reset Board command
  - The display will show the text `RST BRD' in the digits.

- Playback command
  - The display shows the text `PLAYBACK' in the digits.

- AD-DA recording command
  - The display shows the text `RECORD' in the digits and the ANALOG label is lighting up.

- Slave Cinch recording command
  - The display shows the text `CIN REC' in the digits.

Slave XLR recording command
  - The display shows the text `XLR REC' in the digits.

- SRC Cinch recording command
  - The display shows the text `CIN REC' in the digits and the label SRC is lighting up.

- SRC XLR recording command
  - The display shows the text `XLR REC' in the digits and the label SRC is lighting up.

- Toggle Cascade command
  - The display will either show the text `CASC ON' or the text `CASC OFF'.

- Toggle Deemphasis command
  - The display will either show the text `EMPH ON' or the text `EMPH OFF'.

- Toggle Impedance Switch
  - The display will either show the text `SENS +4' or the text `SENS - 10' and the label ANALOG is lighting up.

- Eeprom test command
  - The display will show the text `EEP xxx' ,where xxx is the eeprom byte to be tested.

- Eeprom Clear command
  - The display will show the text `RST EEP'.

- ROM-Version of CDR620/CDR615
  - The display will show the text `VERS XX'.

- Diagnostic of the CDR-Module
  - The display will show the text `DIAGNOST'.
  - OK ——> CDD0000
  - NG ——> CDD※※※※ (※※※※ : ERROR CODE)

## 1.8.2 MONO BOARD

## 1. REQUIREMENTS

The instruments used to make this controle prescription are listed below :

- Audio precision
- Oscilloscope
- A voltmeter

## 2. GENERAL OVERVIEW

You can see in figure 1 a global block diagram of the CDR620/CDR615. The most important blocks are discussed later in this report.

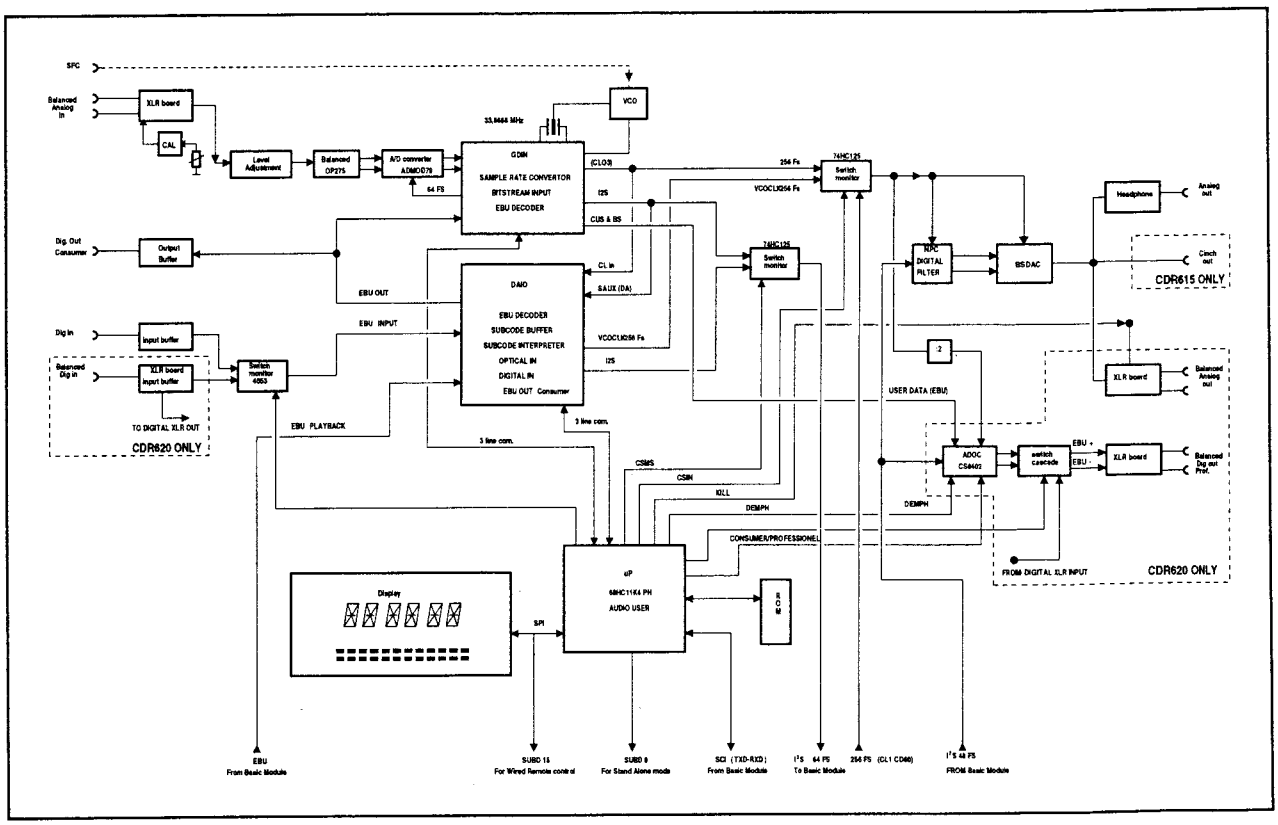



**Figure 2.2**

# 3. XLR BOARD

## 3.1 INPUT CIRCUITRY

The XLR board has an balanced analog input circuitry, the signal will be transfered to a single ended signal that goes to the level adjustment point. The impedance switch (nr.1 fig.3.1.a) on the XLR input is controlled depending on the microprocessor, which will switch the state by preset mode or when the input signal is to big or to small. On the XLR inputs, there is also a trimmer, which controls the balance between the inputs (nr.2 fig.3.1.a).

It's necessary to adjust these trimmers, so that there is a balance between the inputs. The differential amplifier converts from the balanced signals to a single ended signal (nr.3 fig.3.1.a). At the end there's a buffer, this element is placed for buffering the circuitry and for low output resistance which will give a better preformance in crosstalk and less distortion. (nr.4 fig. 3.1.a)

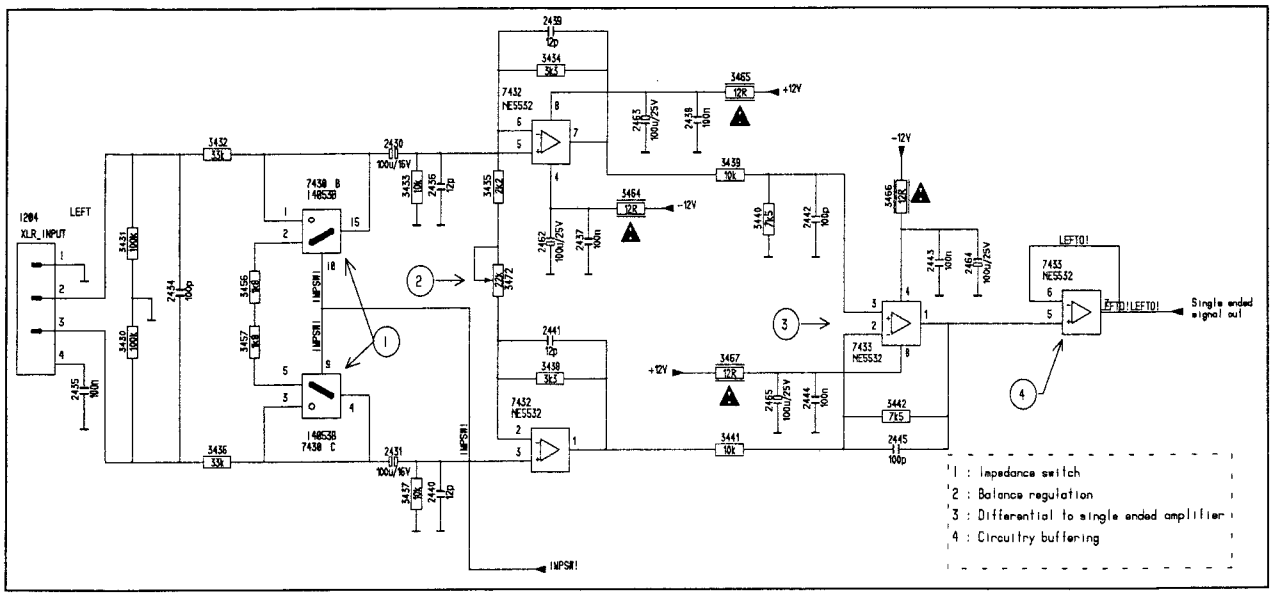
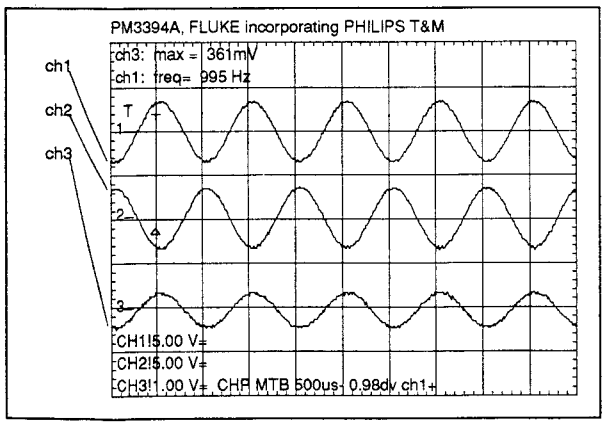



**Figure 3.1.a**

**MEASUREMENTS**

In figure 3.1.b. we have an analog balanced input signal of 1 kHz 4.887 Vrms. Channel 1 and 2 are measured on the 2 signal pins of the XLR input plug (pin 2 and 3), _channel 3 is measured on the connector to the level print. Note that the single ended signal comming from the XLR board is only 0.5 Vrms (± 0.1 dB) in amplitude.




CHANNEL 1 : BALANCED 1 kHz IN 4.887 Vrms (POSITIVE) (on XLR input pin nr. 2 )

CHANNEL 2 : BALANCED 1 kHz IN ( NEGATIVE) (on XLR input pin nr. 3 )

CHANNEL 3 : SINGLE ENDED OUTPUT 1 kHz 0.5 Vrms

**Figure 3.1.b**

**ADJUSTMENTS**

The potentiometer (nr.2 in figure 3.1.a) has to be adjusted for a well balanced analog input circuit. Here we use the Audio Precision, you have to give an input signal for the CDR of 1 kHz +16 dBu, you reset the GDIN with the software and you measure the voltage on the input connector of the level print (with an voltmeter), this has to be ±500 mV rms (±0.1 dB). When you give the command "Toggle imp_switch", the input has to be reduced till 2 dBu input, and must also give ±500 mV rms (±0.1 dB). This has to be done for both channels.

## 3.2 OUTPUT CIRCUITRY (CDR620 ONLY)

The output circuitry is analog here we make from the single ended signal a balanced signal. (fig.3.2.a) The single ended input signal will be first amplified with an amplifier with very low distortion because the XLR output has a voltage of ±4.88 Vrms (nr.1 fig.3.2.a). For making the signal balanced, the signal is fed to an inverting - and a non - inverting amplifier. Eventualy the signal is fed to a buffer for the output (nr.2 fig.3.2.a). At the end of the circuitry we see 2 FET's, these will short the outputs when the base of the FET is positive ( ≈ +12V), the analog kill (nr.3 fig.3.2.a).

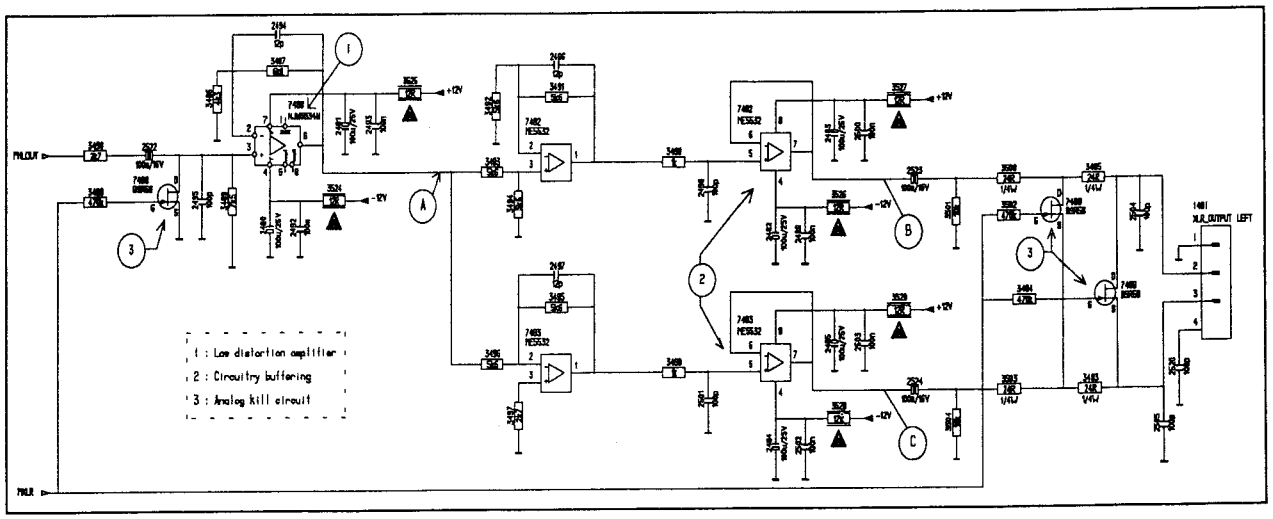
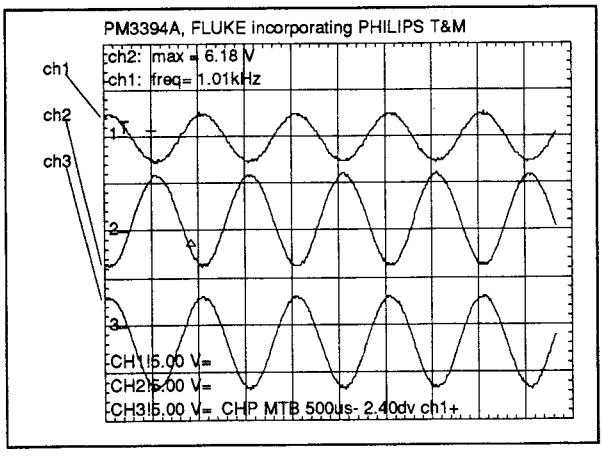



**Figure 3.2.a**

### MEASUREMENTS

Connect the digital input and configure the Audio Precision for a digital output of 1 kHz 100% full scale amplitude. Put the unit in "src_xlr" then you must measure on the points A,B and C 3.65 Vrms. On the points D and E of figure 3.2.c you must measure 0.98 V rms and on points F and G 1.95 V rms.

In figure 3.2.b. we have an single ended input signal of 1 kHz ±2.61 V. Channel 1 is measured after the first opamp after the BSDAC (on pin 1 of the OP275 IC fig.3.2.c). Channel 2 and 3 are the balanced outputs measured on the pins 2 and 3 of the XLR plugs.




CHANNEL 1 : SINGLE ENDED SIGNAL MEASURED AFTER THE FIRST OPAMP AFTER THE BSDAC

CHANNEL 2 : IS SIGNAL ON BALANCED OUTPUT (POSITIVE SIDE) AMPLITUDE IS +6.18 V AND -3.75 v

CHANNEL 3 : IS NEGATIVE SIDE OF BALANCED OUTPUT, THE AMPLITUDE IS +3.25V AND -6.59V

**Figure 3.2.b**

This circuit (fig 3.2.c) after the BSDAC is a filter. The first filter is a low pass filter with a turn point on a frequency of 88 kHz. The second one is a notch filter on a frequency of 340 kHz because of the dither frequency of the BSDAC.

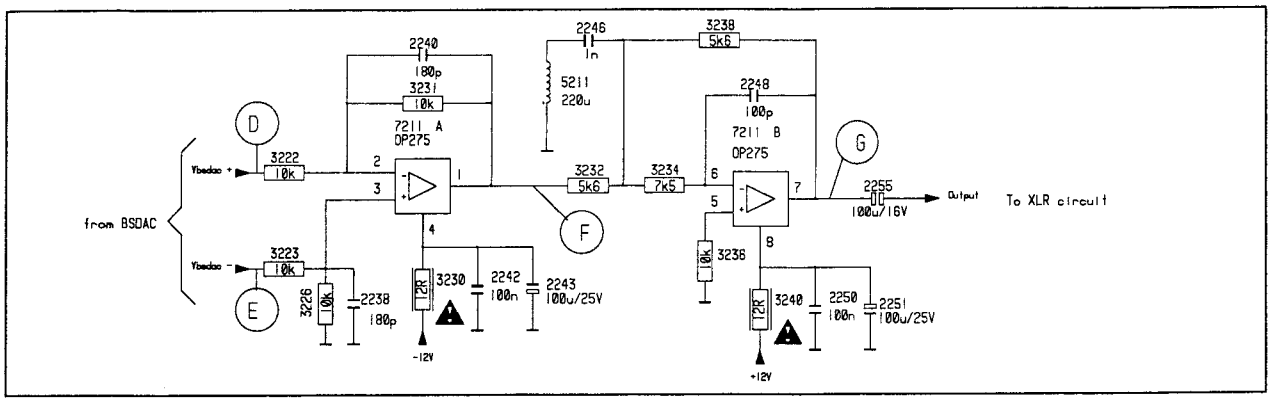
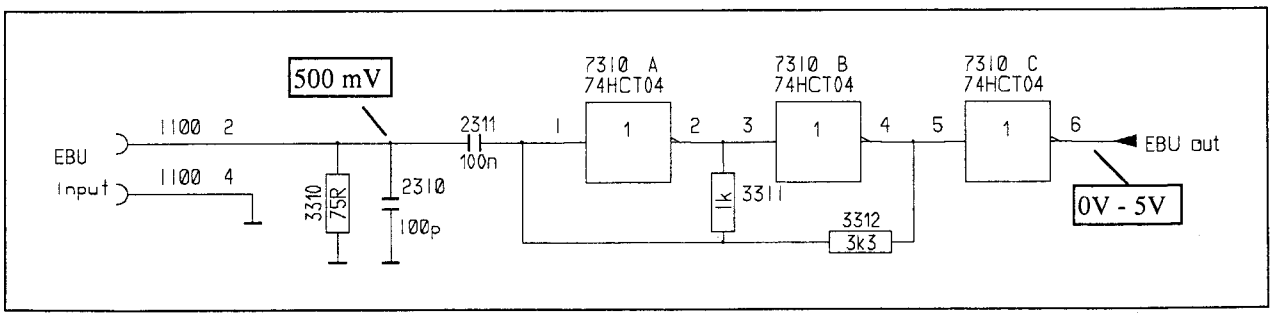



**Figure 3.2.c**

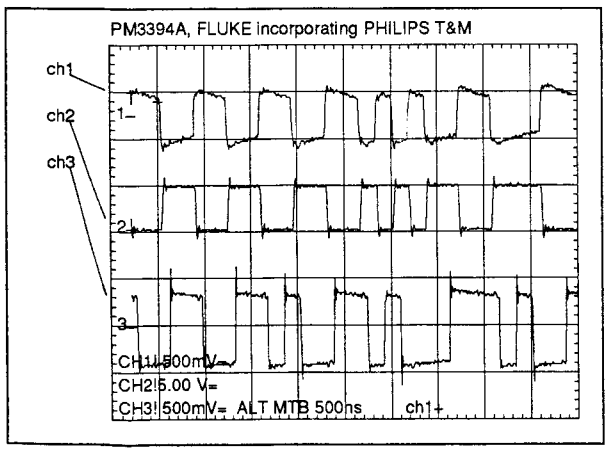
## 4. CINCH DIGITAL INPUT/OUTPUT

The digital input comming from the cinch connector is much lower in level than the TTL logic levels. For this case there is used the slicer system (see fig 4.1), to convert to TTL logic.




**Figuer 4.1**

The frequency of the EBU signal is in the range of the 5.6 MHz. (see fig. 4.2), the level of the cinch input and output is ±500 mV. Notice in figure 4.2 that the amplitude of channel 2 is 5 V/div see also IEC 958.




CHANNEL 1 : EBU IN ON CINCH INPUT CONNECTOR

CHANNEL 2 : EBU IN ON DAIO IC

CHANNEL 3 : EBU OUT ON CINCH CONNECTOR

**Figure 4.2**

## 5. ANALOG INPUT BEFORE AD CONVERSION

The circuit in figure 5.1 makes from the single ended input signal, a balanced analog output signal for the AD convertor. The circuit has a gain of 1 and is only mentioned to convert single ended to balanced and some filtering.

### MEASUREMENT

If we give an analog input signal of 1 kHz 16 dBu, then we get at the output connector (the input connector of the circuit), a voltage of 1.13 Vrms, this voltage must be the same at points A,B and C all measurements are ±0.1 dB.

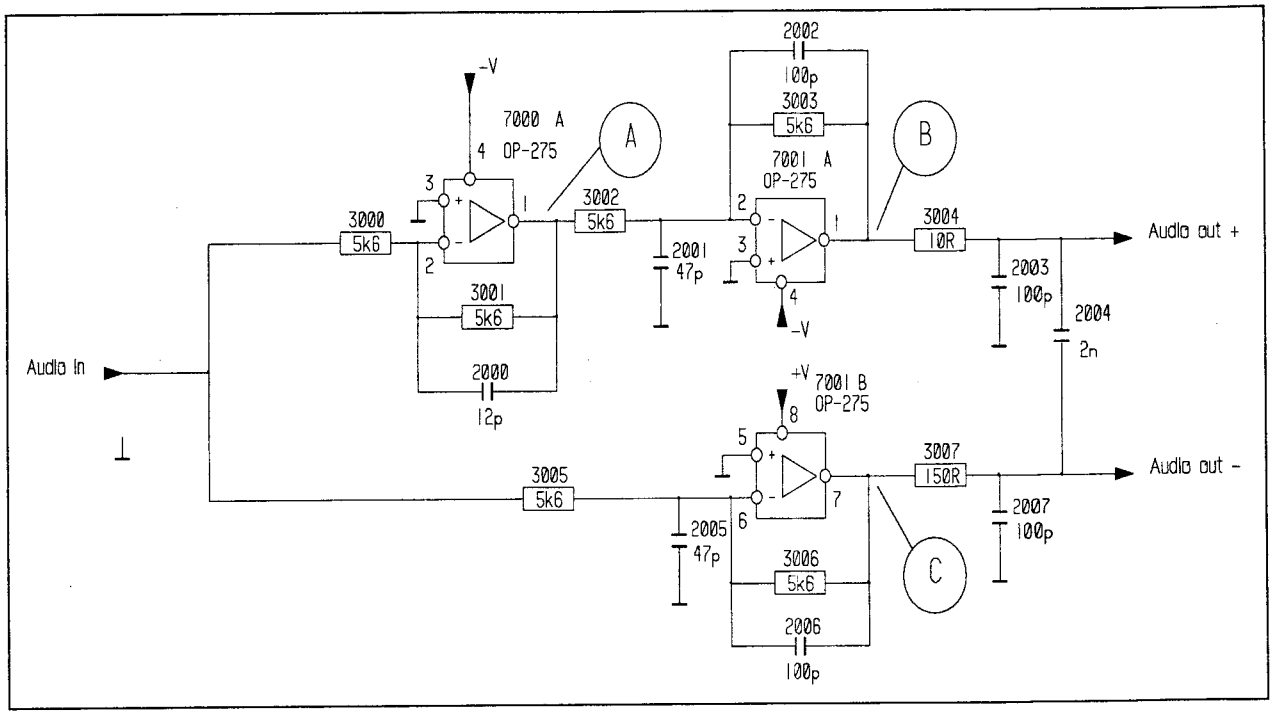
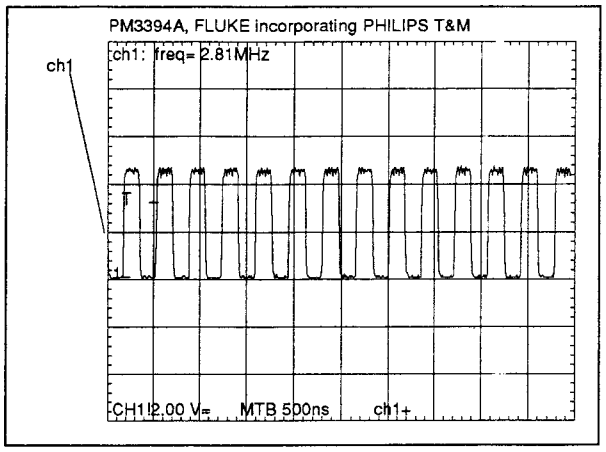



**Figure 5.1**

## 6. A/D CONVERTOR ADMOD79

The ADMOD 79 A/D convertor is a bitstream sigma delta analog/digital convertor. The analog inputs of the convertor are balanced signals (see fig 6.1.2). When the start up of the board is good, there has to be on pin 3 the sample clock, this has a frequency of 2.82 Mhz which is 64 times fs. (see fig. 6.1) This signal is for the synchronization of the bitstream data transfer to the GDIN. The bitstream data has 2 separate outputs 1 for the left - and the other for the right channel.




CHANNEL 1 : SAMPLE CLOCK FROM GDIN 2.82 MHZ
(FOC PIN 56 OF GDIN)

**Figure 6.1.1**

It is very important for the A/D convertor that all supply voltages are present and correct (see p 27 ) , when there is a bad function of the A/D convertor,first check the sample clock and the supply voltages.
The reset (SRSTN!) is connected to the "CALIB" input of the ADMOD, and is active low. Because all of the opamps have a DC output, the ADMOD will calibrate itself to eliminate the offset when there has been a reset. Notice that the power down pin (PWD pin 9) has to be connected to the ground otherwise the ADMOD goes in to power down mode and will not operate anymore.

The analog input for the AD convertor is a balanced signal, the data output is a bitstreamed output where the sample clock takes care of the synchronization.

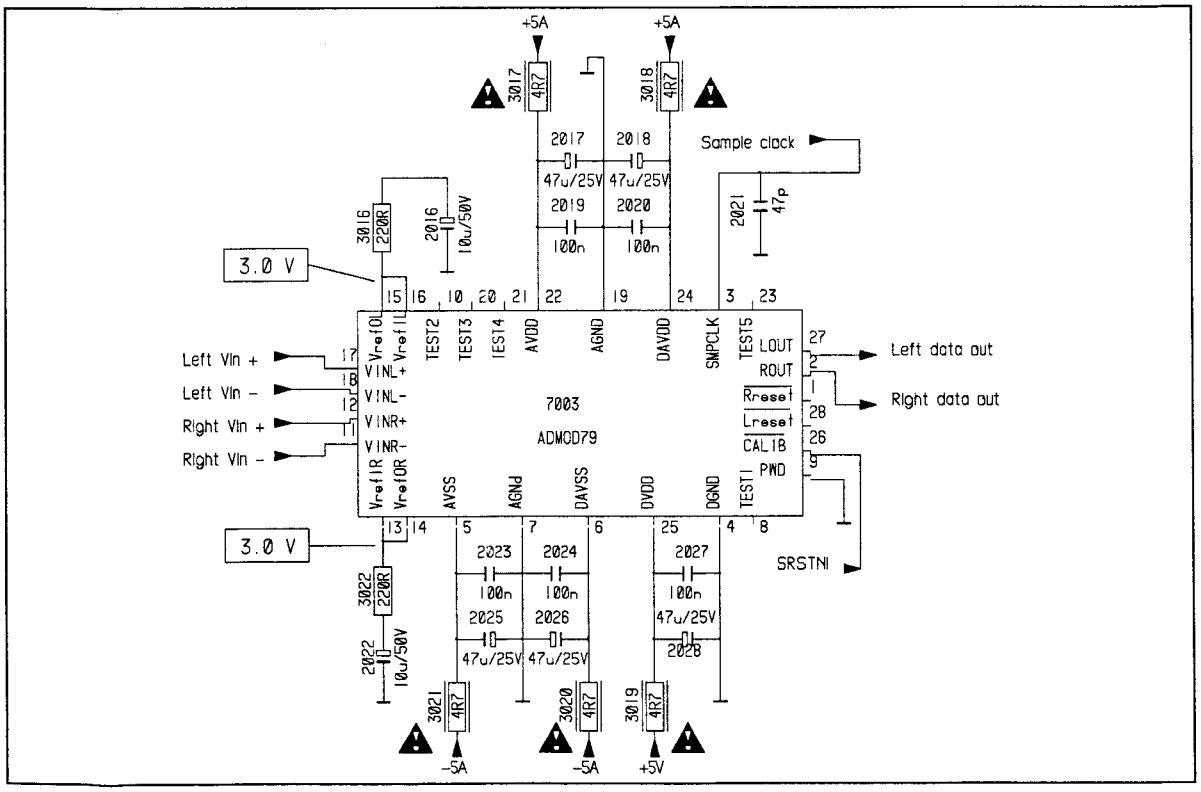



**Figure 6.1.2**

# 7. GDIN

The GDIN is component with a large scale of possibilities, it has a several different modes in which it can be switched. The GDIN is able to fully digitally convert t rates in the range of 15 to 50 kHz to a rate of 44.1 kHz. The GDIN also contains all the digital electronics for Bitstream A/D and D/A conversion.

## 7.1 OPERATION MODES OF GDIN

### 7.1.1 SAMPLE RATE CONVERSION MODE (SRC)

In the sample rate conversion mode, GDIN converts digital audio signals at sampling frequency $f_{in}$ to the output sampling frequency $f_{out}$, determined by the crystal. The range of input frequencies for a given output frequency is given in table 7.1.

| Output frequency (examples) | $I^2S$ input | AES/EBU input |
|---|---|---|
| 48 kHz | 13 - 83 kHz | 16 - 54 kHz |
| 44.1 kHz | 12 - 76 kHz | 15 - 50.4 kHz |
| 32 kHz | 9 - 55 kHz | 12 - 36 kHz |

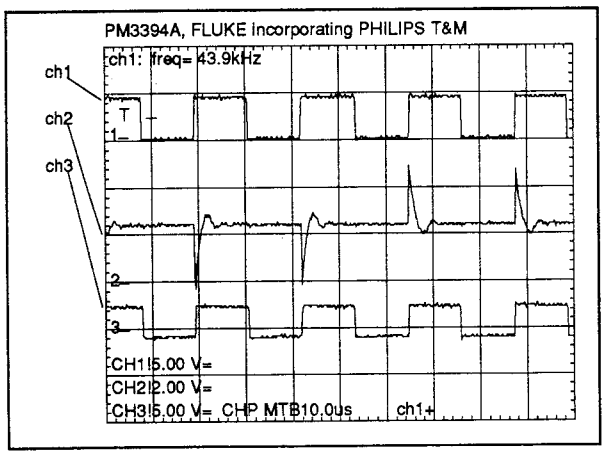
**tabel 7.1**

### 7.1.2 SLAVE - VCO MODE

In the slave - VCO mode, GDIN passes an exact copy of the incoming samples to the output. The output sampling rate is tracking any input sampling rate within the frequency range of the additional external VCO. This mode is not used for the CDR620/CDR615.

### 7.1.3 SLAVE - Xtal MODE

In the slave Xtal mode, GDIN passes an exact copy of the incomming samples to the output. By means of a varicap across the Xtal (see figure 7.1.5), the input rate can be tracked in a frequency range of ±150 ppm around the nominal output sampling frequency. (see figure 7.1.3)




CHANNEL 1 : THIS IS THE CLOCK COMING FROM THE EBU SIGNAL, OR THE STUDIO CLOCK

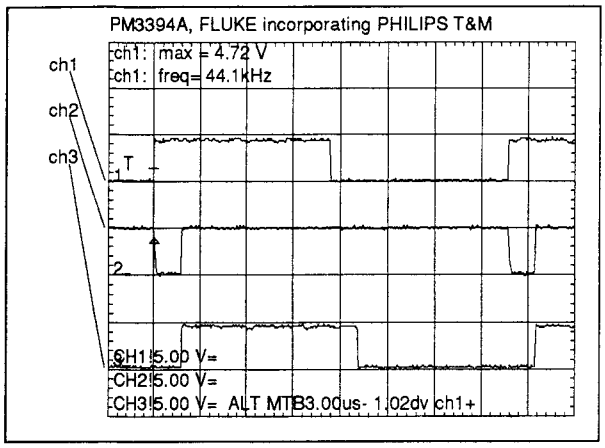
CHANNEL 2 : IS THE SIGNAL THAT TRACKS THE CRYSTAL ON THE INCOMING WORD CLOCK FROM EBU OR STUDIO CLOCK. THIS SIGNAL WILL ONLY BE LIKE THIS IN SLAVE MODE (NR.1 FIG.4.1.5)

CHANNEL 3 : SRWS, IS THE WORD CLOCK COMING FROM THE GDIN WHO GET THIS SIGNAL OUT OF THE $I^2S$ SINGALS

**Figure 7.1.3**

## 7.1.4 A/D - D/A MODE

In the A/D-D/A mode, GDIN supports the realization of A/D and D/A conversion, according to the Bitstream principle.




CHANNEL 1 : IS THE CLOCK COMING FROM THE EBU SIGNAL, OR THE STUDIO CLOCK

CHANNEL 2 : IS THE SIGNAL THAT TRACKS THE CRYSTAL ON THE INCOMING WORD CLOCK FROM EBU OR STUDIO CLOCK

CHANNEL 3 : SRWS IS THE WORD CLOCK COMING FROM THE GDIN, WHO GETS THE SIGNAL OUT OF THE $I^2S$ SIGNAL

**Figure 7.1.4**

## 7.1.5 OPERATION OF CRYSTAL TRACKING

In the schematic you see that we can lock the signal from the GDIN to two signals, the studio clock (FS! ) or the $I^2S$ clock that is extracted from the EBU input (FOW! ), it is the micro processor who determines the position of the switch. These signals are added to a phase comparator, which gives a signal out in function of the difference in phase of the two incomming clocks (see fig. 7.1.3). When the UNLOCK! signal is low (nr.2 fig.7.1.5), than the crystal will track on the clock comming from the EBU or studio clock. The signal comming from the phase comparator (nr .1 fig.7.1.5) goes to a differential amplifier (nr.4 fig.7.1.5), which gives a signal in function to a referention voltage determined by the first opamp. This voltage will control the varicap (nr.3 fig.7.1.5), and thus also the crystal. When the UNLOCK! pin is high, the crystal will not be locked on a incoming clock. The crystal will oscillate at the fixed frequency ±50 ppm. Notice that this frequency can be measured on the CL01 pin of the GDIN (pin 27)

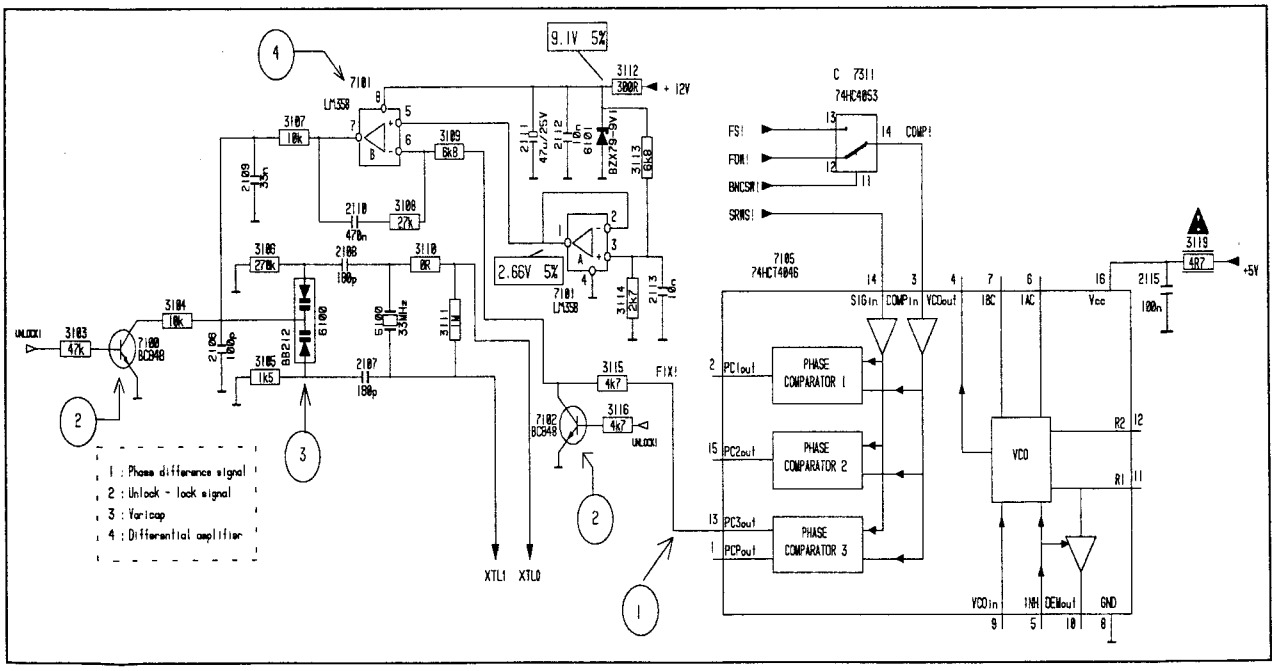
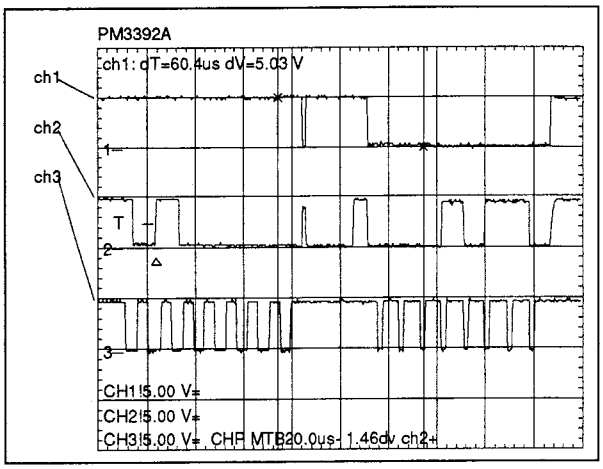



**Figure 7.1.5**

## 7.2 COMMUNICATIONS

### 7.2.1 WITH THE MICROPROCESSOR

The GDIN can be programmed or communicate with the microprocessor by 3 wires : GDINLD!, GDINDA! and GDINCL!.
The GDINLD! is the load line which says if we want to read or write, if the line is high, we are in write mode and if low the GDIN is in read mode.(input line) The GDINDA! is the data line, input output. The GDINCL! is the bit clock line for the GDIN.(output line ).(see fig.7.2.1)




CHANNEL 1 : GDINLD!

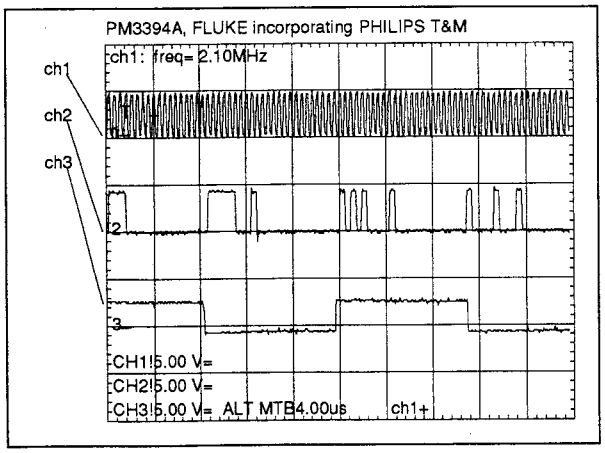
CHANNEL 2 : GDINDA!

CHANNEL 3 : GDINCL!

**Figure 7.2.1**

### 7.2.2 I²S OUTPUT

The I²S output is used for the digital audio output. The communication is a 3 line communication. The digital audio output word select ($f_{out}$) SRWS has a frequency of 44.1 kHz. The output bit clock SRCL has a frequency of 48 x $f_{out} \approx$ 2.1 MHz (see fig 7.2.2.1). Note that the SRDA! coming from the I²S of the GDIN is half a clock out of phase(see fig 7.2.2.2), this is why we shift the data with the circuit as in fig. 7.2.2.3 on the 4 times the clock frequency DO2C!.

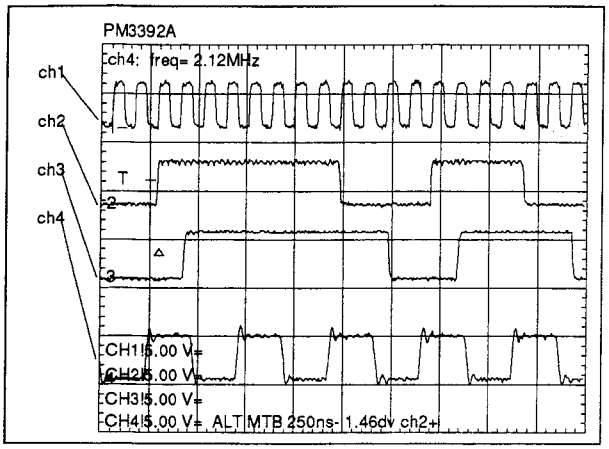



CHANNEL 1 : SRCL, IS THE BIT CLOCK (48x $F_{OUT} \approx$ 2.1 MHZ)

CHANNEL 2 : SRDA, DATA SIGNAL

CHANNEL 3 : SRWS, THE WORD CLOCK (44.1 kHz)

**Figure 7.2.2 1**




CHANNEL 1 : DO2C! : THIS IS 4 TIMES THE I²C CLOCK

CHANNEL 2 : SRDA! : THIS DATA HAS TO BE SHIFT OVER 1/2 OF THE I²S CLOCK

CHANNEL 3 : GDDA! : THIS IS THE SHIFTED I²S DATA

CHANNEL 4 : SRCL! : THIS IS THE I2S CLOCK.

**Figure 7.2.2 2**

The circuit in fig. 7.2.2.3 will shift the data half a clock of the I²S out clock, this because the data signal has to be stable on the rising edge of the clock. The signal DO2C! is 4 times the I²S clock frequency (nr.1). So the output (nr.3) will be shift 1 clock (DO2C!) period,which equals quarter of the I²S clock.

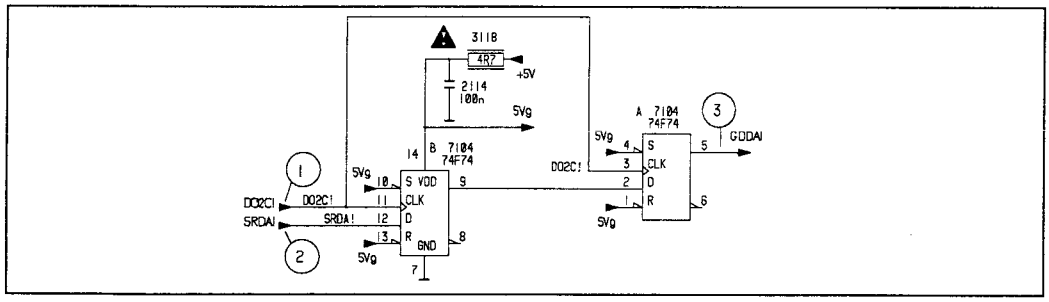


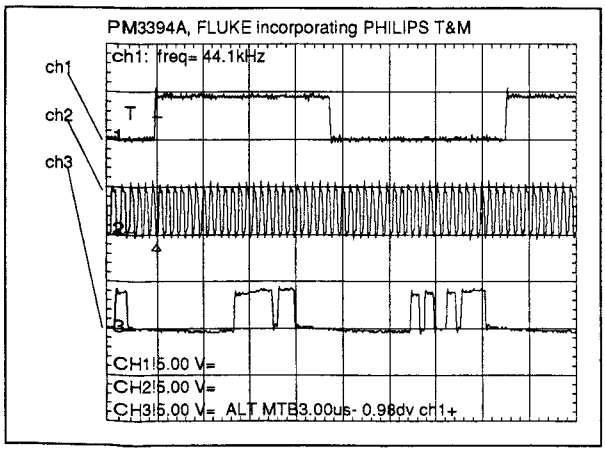

**Figure 7.2.2.3**

## 8. DAIO TDA1315

The Digital Audio Input/Output circuit is a complete transceiver for biphase-mark encoded digital audio signals that conform to the SPDIF standard. In the receive mode, the device adjusts automatically to one of the three standardized sample frequencies (32, 44.1 or 48 kHz) , decodes the input signal and separates audio and control data. A clock signal of either 256 or 384 times the sample frequency is generated to serve as a master clock signal in digital audio systems. In the transmit mode, the device multiplexes the audio, control and user data and encodes it for subsequent transmission via a cable or optical link.

This component also communicates with the micro-processor by a 3 wire communication, (see fig. 7.2.2.1) (lines CDAIDA!, CDAICL! and CDAILD!)

The DAIO can take EBU signal in (see fig. 4.2), interprete the subcode and send EBU out and I2S out (see fig 8.1).




CHANNEL 1 : WORD CLOCK 44.1 kHz

CHANNEL 2 : CLOCK LINE (2.1 MHz SQUARE WAVE

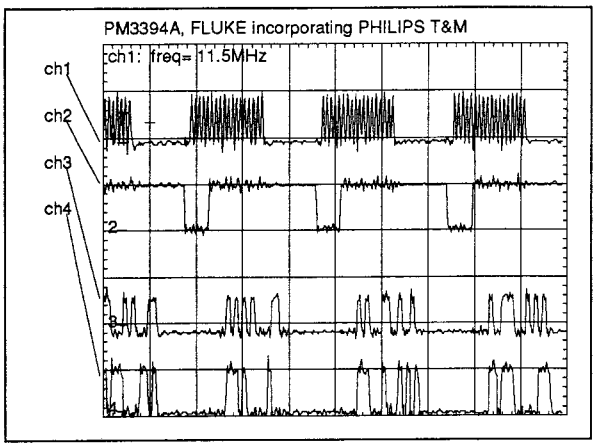
CHANNEL 3 : DATA LINE

**Figure 8.1**

## 9. NPC / BSDAC

The NPC is a digital filter and gets its communication with the microprocessor done with almost the same lines as the GDIN, GDINLD!, GDINDA! and CL/NPC!. The input concerning the audio data, the NPC gets from the $I^2S$ input on the monoboard, FDA!, FCL! and FWS1.

The resulting data (filtered) goes to the BSDAC by the lines DOR!, DOL!, BSWS! and BSCL!. This is almost the same as the $I^2S$ communication, only the data path is split into the left and right channel.(see fig.9.1)




CHANNEL 1 : BSCL! THIS SIGNAL CONTAINS THE CLOCK SIGNAL WITH A FREQUENCY OF 11.4 MHz

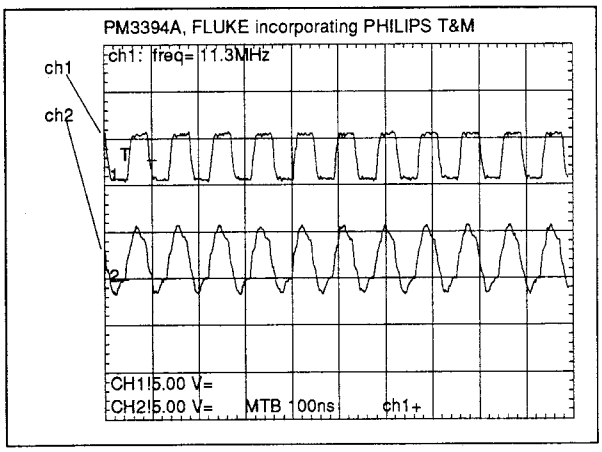
CHANNEL 2 : BSWS! REPRESENT THE WORD CLOCK WITH A FREQUENCY OF 352 kHz $\approx$ 8 X $F_S$

CHANNEL 3 : DOL! CONTAINS THE AUDIO DATA FOR THE LEFT CHANNEL

CHANNEL 4 : DOR! CONTAINS THE AUDIO DATA FOR THE RIGHT CHANNEL

**Figure 9.1**

So the BSDAC gets its data bitstream $I^2S$ in, and gives a balanced analog signal out. The NPC and the BSDAC have an internal clock determined by MCLK! of 11.2896 MHz. square wave. (see fig. 9.2)




CHANNEL 1 : MCLKA! IS THE MASTER CLOCK FOR THE DAC, ON A FREQUENCY OF 11.2896 MHz

CHANNEL 2 : GDMCLK! IS THE DAIO MASTER CLOCK ALSO ON 11.2896 MHz

**Figure 9.2**

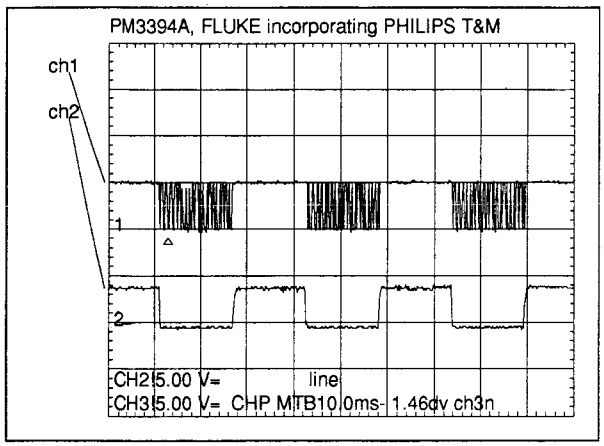
# 10. MICROPROCESSOR

The microprocessor is the heart of the CDR, the microprocessor functions are :

- communication with the display / wired remote
- controls all analog switches
- 3 line communication / programmation of the :- GDIN
  - NPC
  - DAIO
- handling the RC5 communication
- communication with CDD2000 module

## 10.1 DISPLAY COMMUNICATION

For the display communication we have to make a difference for the case without wired remote and with wired remote, because the display select line will have different patterns. When there is NO remote attached the communication goes as folows : there is a display clock (a square wave) with a frequency of 125 kHz, a display select line and an acknowledge line which is asserted when the received data has been accepted. (see fig. 10.1.1)

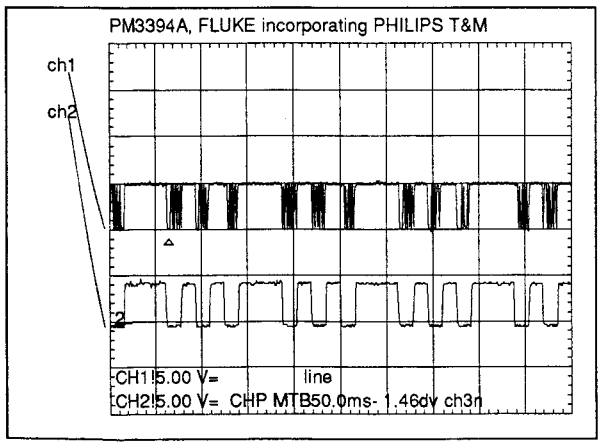



CHANNEL 1 : DACK

CHANNEL 2 : DSEL IS THE DISPLAY SELECT LINE AND HAS A FREQUENCY OF 32 Hz WHEN NO REMOTE ATTACHED.

**Figure 10.1.1**

When there is a remote attached the communication goes as folows : there is a display clock (a square wave) with a frequency of 125 kHz, a display select line which is in this case 1/3 from the updating of the remote display, and an acknowledge line which is asserted when the received data has been accepted. (see fig. 10.1.2)




CHANNEL 1 : DACK

CHANNEL 2 : DSEL THIS SIGNAL SHOWS THAT THE UPDATING OF THE DISPLAY IS 1/3 FROM THE UPDATING OF THE REMOTE DISPLAY

**Figure 10.1.2**

## 10.2 MICROPROCESSOR OPERATION

The E signal of the microprocessor is a helping signal to make the read and write lines for memory and buffers. When this signal is not present, the board will not operate. The E - signal has to be a square wave of 4 MHz clock frequency.
The first figure (fig.10.2.1) is the same E signal but sometimes we got a frequency change in the signal ???

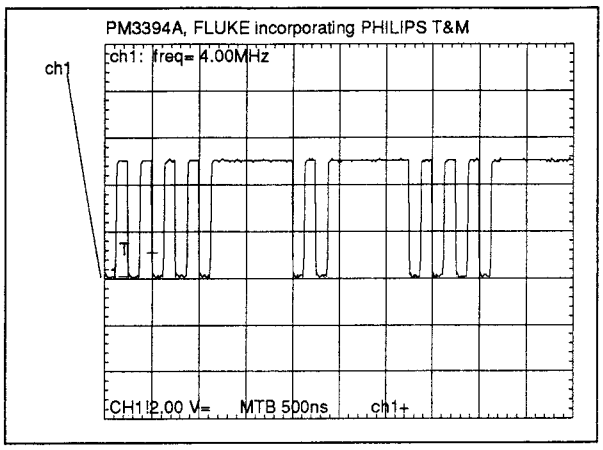



**Figure 10.2.1**

The normal E signal should look like the folowing picture

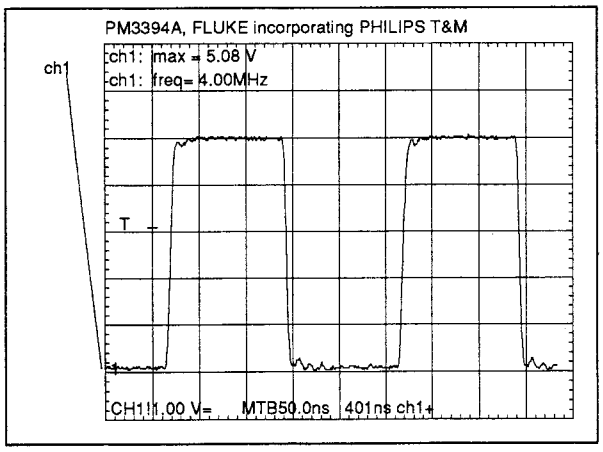
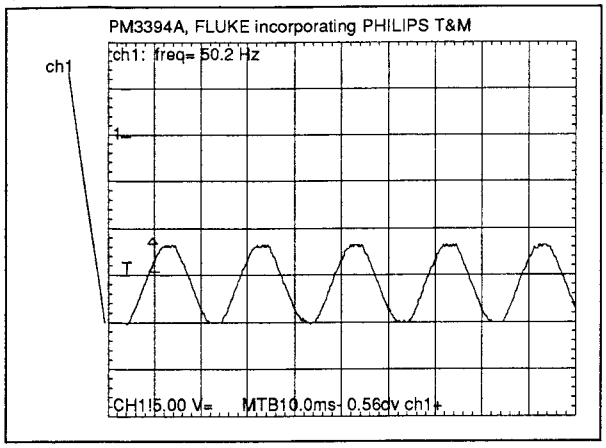



**Figure 10.2.2**

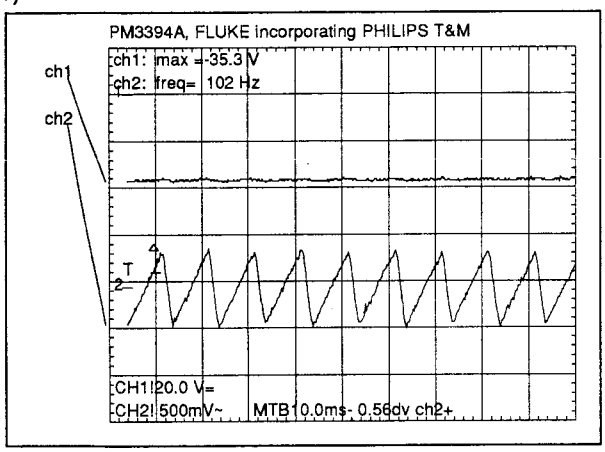
## 11. SUPPLY MEASUREMENTS

### a) VFILIR, VFIL2R




CHANNEL 1 : VFILIR, VFIL2R THIS IS THE VOLTAGE FOR THE FILAMENTS OF THE FTD. THE VOLTAGE IS -17 V ± 3.5 V WITH A FREQUENCY OF ≈ 50 Hz

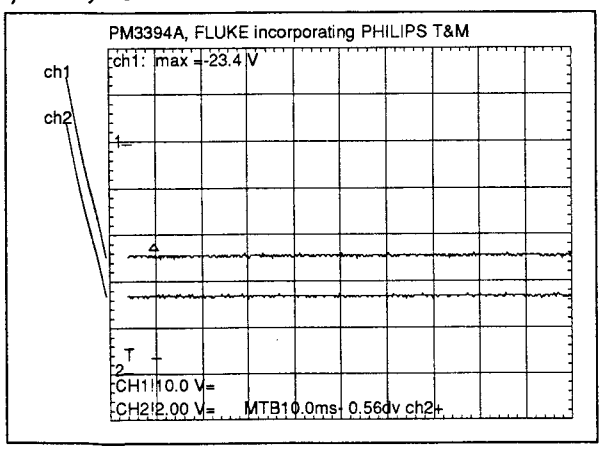
### b) REFFIL




CHANNEL 1 : DC VOLTAGE ≈ -35 V

CHANNEL 2 : AC VOLTAGE 100 HZ TRIANGLE ±500 MV

### c) VFTD, POFF




CHANNEL 1 : VFTD VOLTAGE ≈ -23 V THIS IS THE VOLTAGE FOR DRIVING THE FTD SEGMENTS.

CHANNEL 2 : POFF VOLTAGE ≈ 3.5 V

## d) SUPPLY VOLTAGES

In the folowing table you see all the DC supply volgtages and ripples from the monoboard CDR620. All measurements are done on the supply of the givencomponents, this always on the side to the IC. If there's a measurement on a capacitor done, it will always be on the positive side of the capacitor.

| Component number | Voltage ( Volts ) | Ripple ( mV ) | Resolution |
|---|---|---|---|
| | | | |
| 2382+ | 5.17 | ±15 | |
| 2383+ | 5.17 | ±25 | |
| 2381+ | 5.17 | ±25 | |
| 2394+ | 5.25 | +10 -5 | |
| 2400+ | not present | +10 -5 | |
| 2152 | 5.1 | ±15 | |
| 3017 | 4.8 | ±10 | |
| 3018 | 5 | ±30 | |
| 3019 | 5.15 | +20 -10 | |
| 3020 | -5 | +50 - 40 | |
| 3021 | -4.8 | +30 - 25 | |
| 3100 | 5.2 | ±10 | |
| 3101 | 5.2 | ±10 | |
| 3102 | 5.2 | ±10 | |
| 3112 | 12 | +40 -20 | |
| 3118 | 5.2 | ±24 | |
| 3119 | 5.2 | ±10 | |
| 3150 | 5.2 | ±20 | |
| 3151 | not present | | |
| 3158 | 3.9 | ±10 | |
| 3201 | 5.2 | ±10 | |
| 3210 | 5.2 | ±20 | |
| 3214 | 5.2 | ±20 | |
| 3220 | 5.2 | ±20 | |
| 3221 | 5.1 | ±15 | |
| 3228 | -12 | +72 -40 | |
| 3230 | -12 | +50 -22 | |
| 3240 | 12 | 30 + -20 | |
| 3241 | 12 | ±20 | |
| 3282 | 12 | +35 -15 | |
| 3284 | 12 | ±20 | |
| 3285 | -11.8 | +60 -40 | |
| 3300 | 5.3 | ±10 | |
| 3301 | 5.2 | ±20 | |

| Component number | Volltage ( Volts ) | Ripple ( mV ) | Resolution |
|---|---|---|---|
| | | | |
| 3313 | 5.2 | ±20 | |
| 3314 | 5.2 | ±20 | |
| 3343 | 5.2 | +30 -16 | |
| 3380 | 5.25 | ±30 | |
| 3381 | 5.1 | ±20 | |
| 3382 | 5.15 | ±25 | |
| 3383 | 5.2 | ±20 | |
| 3384 | 5.2 | ±20 | |
| 3385 | 5.2 | ±15 | |
| 3389 | 5.25 | +70 -80 | |
| 3391 | 5.15 | +10 -5 | |
| 3392 | 5.2 | +10 -5 | |
| 3393 | 5.2 | ±20 | |
| 3404 | 5.15 | +55 -40 | |
| 3410 | 5.25 | ±10 | |
| 3411 | 5.05 | +15 -5 | |
| 3412 | 5.1 | ±10 | |
| 3413 | 5.25 | ±10 | |
| 3427 | 5.25 | ±10 | |
| 3464 | -11.8 | +40 -20 | |
| 3465 | 12 | ±5 | |
| 3466 | -11.8 | +40 -20 | |
| 3467 | 11.9 | +10 -5 | |
| 3468 | -11.8 | +40 -20 | |
| 3469 | 11.8 | +10 -5 | |
| 3470 | -11.8 | +40 -20 | |
| 3471 | 12 | +30 -10 | |
| 3524 | -12 | +60 -35 | |
| 3525 | 12 | +35 -15 | |
| 3526 | -11.8 | +35 -25 | |
| 3527 | 12 | +30 -20 | |
| 3528 | -11.8 | ±30 | |
| 3529 | 12 | ±20 | |
| 3530 | -12 | ±30 | |

| Component number | Volltage ( Volts ) | Ripple ( mV ) | Resolution |
|---|---|---|---|
| | | | |
| 3531 | 12 | ±20 | |
| 3532 | -11.8 | ±35 | |
| 3533 | 12 | +30 -15 | |
| 3534 | -11.8 | ±30 | |
| 3535 | 11.8 | ±15 | |
| 7003-25 | 5.1 | ±30 | |
| 7003-24 | 5.1 | +48 -62 | |
| 7003-22 | 4.8 | +32 -20 | |
| 7003-19 | 0 | ±10 | |
| 7000-8 | 5.4 | ±2 | |
| 7001-8 | 6 | | |
| 7002-8 | 6 | | |
| 7003-9 | 0 | ±20 | |
| 7000-4 | -6.4 | ±2 | |
| 7003-7 | 0 | ±16 | |
| 7001-4 | -6.4 | | |
| 7003-6 | -5 | ±56 | |
| 7002-4 | -6.4 | | |
| 7003-5 | -4.8 | ±36 | |
| 7004-3 | 5.1 | +20 -10 | |
| 7005-3 | -5.2 | +20 -10 | |
| 7004-1 | 12 | ±50 | |
| 7005-2 | -15 | +60 -80 | |
| 7103-39 | 5 | +150 -300 | |
| 7103-19 | 4.8 | ±20 | |
| 7103-17 | 0 | ±20 | |
| 7103-14 | 4.8 | +60 -85 | |
| 7103-13 | 0 | ±20 | |
| 7103-12 | 0 | ±20 | |
| 7103-11 | 4.8 | +70 -90 | |
| 7103-8 | 0 | ±10 | |
| 7103-7 | 5 | +180 -210 | |
| 7103-3 | 5 | +28 -40 | |
| 7103-1 | 0 | ±10 | |
| 7311-16 | 5.2 | ±20 | |
| 7390 | 5.17 | | |
| 7386 | 5.17 | | |

| Component number | Volltage ( Volts ) | Ripple ( mV ) | Resolution |
|---|---|---|---|
| | | | |
| 7430 | 5.76 | | |
| 7431 | 5.76 | | |
| 7381 | 5.18 | | |
| 7391 | 5.09 | | |
| 7394 | 5.09 | | |
| 7414 | 5.17 | | |
| 7412 | 5.18 | | |
| 7200 | 4.77 | | |
| 7410 | 4.96 | +15 -10 | |
| 7383 | 5.16 | +15 -10 | |
| 7413 | 5.16 | | |
| 7411 | 5.00 | +10 | |
| 7393 | 5.09 | | |
| 7392 | 5.09 | | |
| 7384 | 5.16 | | |
| 7385 | 5.17 | | |
| 7387 | 5.17 | | |
| 7310 | 5.05 | | |
| 7311 | 5.18 | | |
| 7104 | 5.18 | | |
| 7301 | 5.14 | | |
| 7105 | 5.18 | | |
| 7340 | 5.17 | | |
| 7483-4 | -12 | +40 -30 | |
| 7483-8 | +12 | +10 | |
| 7482-4 | -12 | +40 -25 | |
| 7482-8 | +12 | +10 | |
| 7485-4 | -12 | +40-25 | |
| 7485-8 | +12 | +10 | |
| 7484-4 | -12 | +40-25 | |
| 7484-8 | +12 | +10 | |
| 7480-4 | -12 | +40-25 | |
| 7480-8 | +12 | 10 | |
| 7481-4 | -12 | +40-25 | |
| 7481-8 | +12 | +10 | |
| | | | |
| | | | |

## 1.8.3 POWER SUPPLY

## 1. GENERAL WORKING

See schematic page 1-47 – 48.

## 1.1 POWER CONVERSION

### 1.1.1 PRIMARY CIRCUIT.

- The primary voltage enters the circuit by component 1500 (Prof. version), and 5501 (Cons.version). Beside the function of main input, this component also functions as a mains filter. The isolation between primary and secondary is only single for the Prof. version. The grounding here functions as a safety grounding. You have to consider this information for the high voltage tests. In the rest of the apparatus the safety is reached by a double or an amplified isolation between primary - and secondary circuit.
  In the Cons. version there is double isolation.

- The primary fuse 1501 has to secure the apparatus against :
  - Shorts in the primary circuit (transformator and primary tracks)
  - Wrong setting of the voltage selector wich results, without precausion, in a to high voltage in the secundary part.

- The mains switch 1508 is singular

- The voltage selector 1503 accepts a setting in the following voltage range :
  100 / 120 / 230 / 240 Volts

- Capacitor C2500 makes together with the coil of the transformator a resonantion circuit, this circuit makes sure that by sudden mains interrupts, cause no to high spikes or high frequencies reach the secondary circuit.

- The mains transformer is universal because of the different connections in the primary coil. This requests a special consideration by the release. On the secondary side is, because of simplicity, only a winding for the DC voltage and a filament winding.

### 1.1.2 RECTIFIER AND EQUALIZATION.

There is used a transformer 1516 with two secundary windings and a middle connection. The first winding 1516 / 4-5-6 is meant for the rectification voltages, and the second winding 1516 / 1-2-3 is for the display voltages.
The rectificated voltages are built up of three different arrangements, which will always be rectified by a double sided rectifier that is built out of discrete components followed by an equalization.

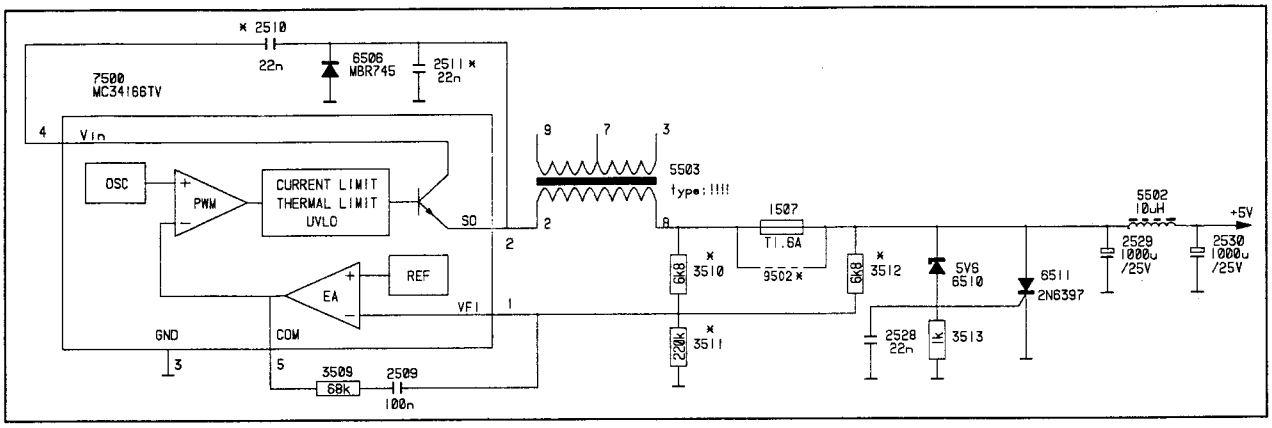
- D6502 and D6503 together with C2505 takes care of the first DC voltage
- D6500 and D6501 together with C2503,C2504 and C2502 for the second DC voltage
- D6523 and D6524 together with C2533 for the third DC voltage.

Because these are taken on the same winding of the transformer, the first and second voltage will be approximaly equal : ±32,5 Volts, for the third voltage this is identical but only negative. The values of the elco's are choosen so that they make sure that by a maximum load and the ripple voltage stays within specifications.

## 1.1.3 STABILIZATION.

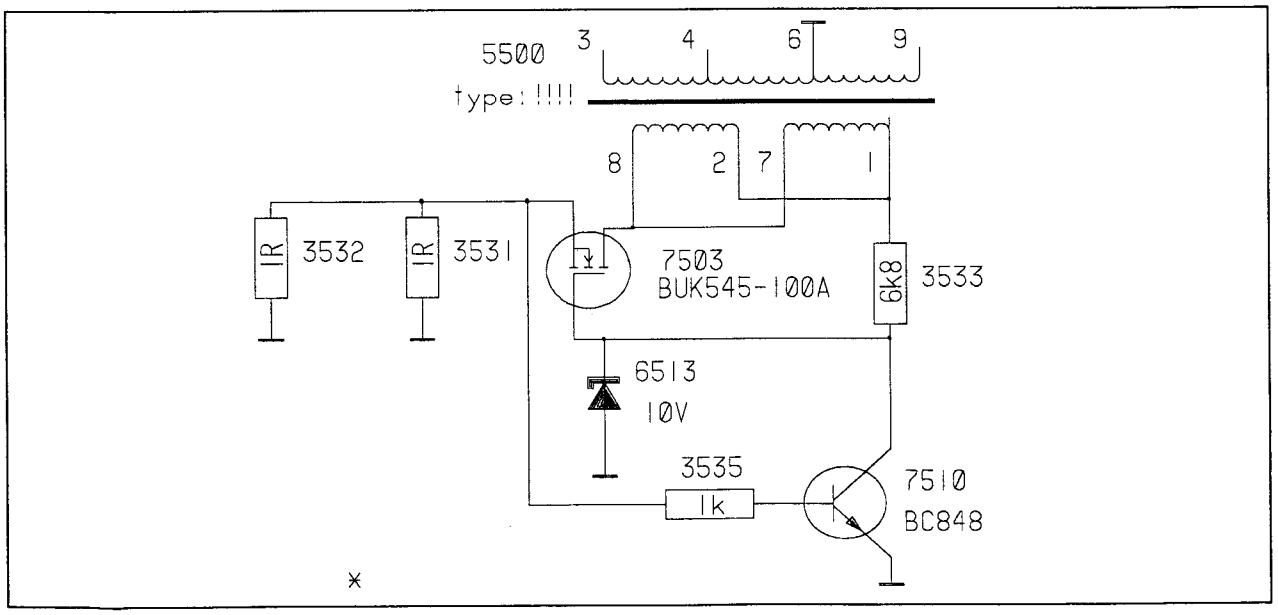
The + 5 V is made out of the second DC voltage with after it a switched stabilizer 7500 (MC34167). Because of this principle, it is possible to convert a voltage in the range of 20 - 40 volts to a voltage of +5 V with a constant efficiency. In case of a mains interruption the voltage over the capacitors C2303 and C2304 are allowed to drop until a voltage of approximatly 8 volts before the regulation drops out.

The regulation is done by a feedback by the resistors R3510 or R3512. The tolerance of the output voltage is from 4.9 volts until 5.15 volts. By adding the resistor R3511 the output voltage can be increased. To protect the apparatus against overvoltage, there's a thyristor 6511 wich pulls the output of 7500 (MC34167) to ground when the voltage of 6,2 volts is crossed.




**Figuer 1.1.3.1**

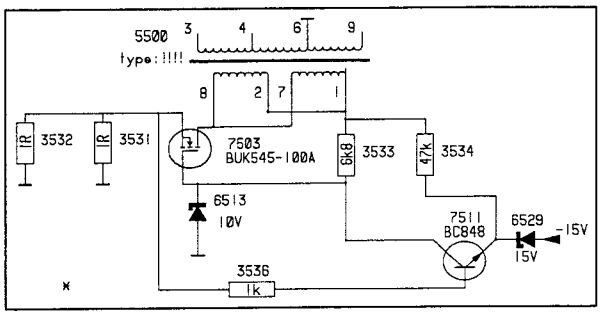
The voltages for the + 12 V and - 12 V comes from the first DC voltage. The control we use here exists out of a FET 7503 and a coil 5500 and some other components. The startup goes as folows :




**Figuer 1.1.3.2**

The FET 7503 goes in conduction because of resistor R3533
The FET 7503 goes out of conduction by a current of $R*I_{max} = 0.6\ V$ ==> $I_{max} = 0.6\ V / R3532$ and R3531.

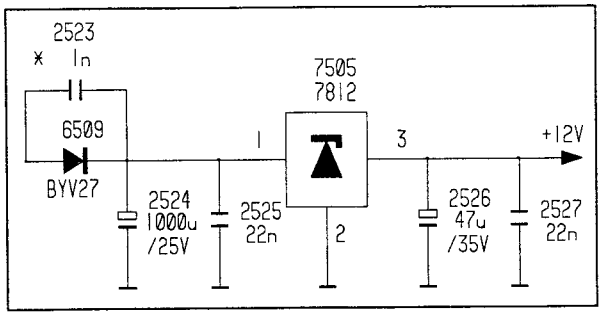
After startup there is voltage regulation. The FET 7503 goes in conduction because of R3533, and out of conduction depending on the output voltage and these is = -15 Volts. $I*R \leq 0.6$ Volts and $I*R - 0.6 - 15 - V_{out} = 0$




**Figuer 1.1.3.3**

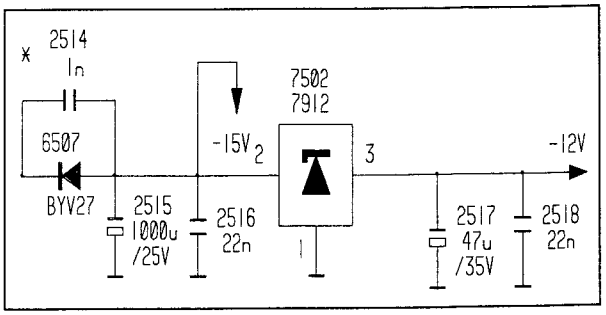
Each time the FET 7503 stops conducting, the voltage at the coil gets so high that the diodes D6509 and D6507 starts conducting. During this time the FET will be kept from conducting by the negative voltage on pin 4 of the transformer 5500 which is connected to the gate of the FET 7503 by resistor R3538 and capacitor C2507.
After that all energy is delivered, pin 4 of the transformer gets positive and the FET goes back into conduction until T7511 is back in conduction and everything starts over again.

D6509 and C2524 take care of a singular rectification with equalization for a voltage of approximaly +16 V and is followed by a stabilizer 7505 (stabilizer 7812) which delivers a nice DC voltage of +12 V.



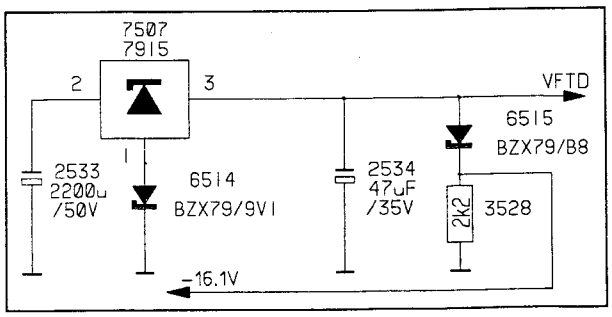

**Figuer 1.1.3.4**

D6507 and C2515 makes a singular rectification with equalization that is approximatly -16V, and is followed by a stabilizer 7502 (stabilizer 7912) which delivers a nice DC voltage of -12 V.




**Figuer 1.1.3.5**

The third DC voltage is for making the VFTD voltage of - 24 Volts
After a double side rectification followed by an equalization this negative voltage goes to a stabilizer 7507 (stabilizer 7915) which is set by a zener diode D6514 of 9.1Volts. The total output voltage is = (-15 Volts) + (-9.1 Volts) = -24.1 volts. On this output theres also a zener D6515 and R3528 set on 8 volts higher than the output voltage of the VFTD. This is -24.1 V + 8 V = -16.1 Volts to give a DC setting to the display.

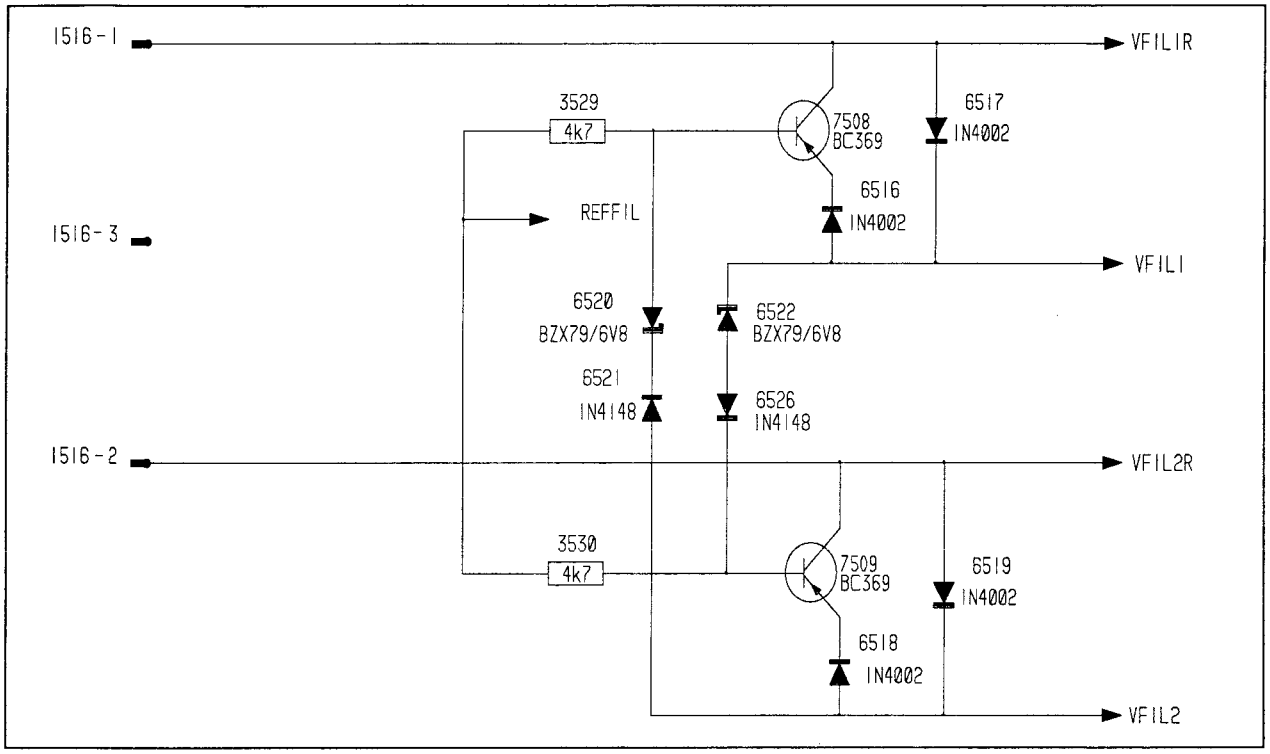



**Figuer 1.1.3.6**

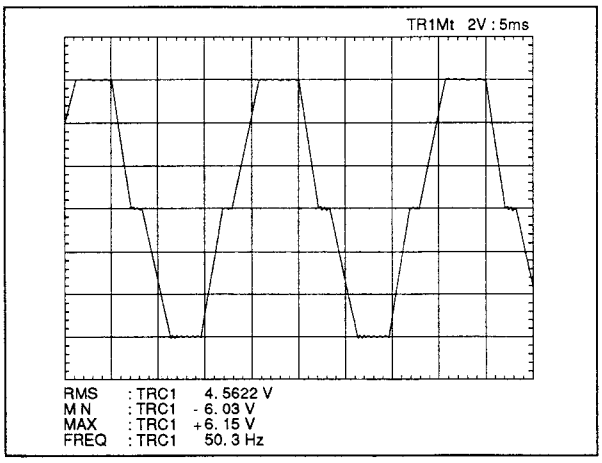
## 1.1.4 STABILIZATION OF DISPLAY VOLTAGE

There's a DC voltage of -16.1 Volts,on the middle connection of the transformer 1516 / 3 (VFTD voltage) with on that DC voltage an AC voltage added. When the input voltage is to low, there will be no limiting by the transistors T7508 and T7509. (the sinus wave is fed through)

By overvoltage there will be a stabilization by cutting of the tops of the sine wave, depending on wich side. This alternation will define which transistor will conduct T7508 or T7509. The top - top value between VFIL1 and VFIL2 is limited until ±6 Volts. (see figure ) This setting is done by the zener diodes D6520 and D6522.




**Figuer 1.1.4.1**




**Figuer 1.1.4.2**

## 2. MEASUREMENT PROCEDURE

## 2.1 POWER CONVERSION

### 2.1.1 CONTROL OF THE STABILIZATION

Connect an AC voltage to point 4,5 and 6 of the transformer T1516 of 27.5 V AC (rms)
Connect an AC voltage to point 1,2 and 3 of the transformer T1516 of 3 V AC (rms)

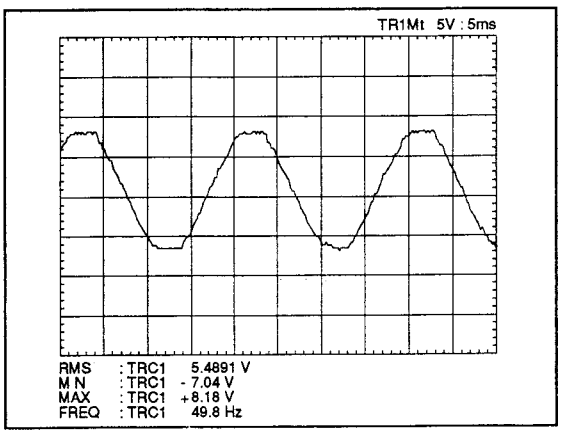
The load on the output of the +5 V is minimum 1,3 A and maximum 2,2 A
The load on the output of the +12 V is minimum 230 mA and maximum 450 mA
The load on the output of the -12 V is minimum 100 mA and maximum 300 mA
The load on the output of the - VFTD is minimum 0 A and maximum 60 mA
The load on the output of the VFIL1 and VFIL2 is minimum 0 A and maximum 250 mA
The load on the output of the VFIL1R and VFIL2R is minimum 0 A and maximum 250 mA

| | | | MIN | TYP | MAX |
|---|---|---|---|---|---|
| Measure on the output the + 5 Volts | (DC) | limit values are | +5.0 | +5 | +5.3 |
| Measure on the output the + 12 Volts | (DC) | limit values are | +11.4 | +12 | +12.6 |
| Measure on the output the - 12 Volts | (DC) | limit values are | -11.4 | -12 | -12.6 |
| Measure on the output the -VFTD | (DC) | limit values are | -22.1 | -24.1 | -26.1 |

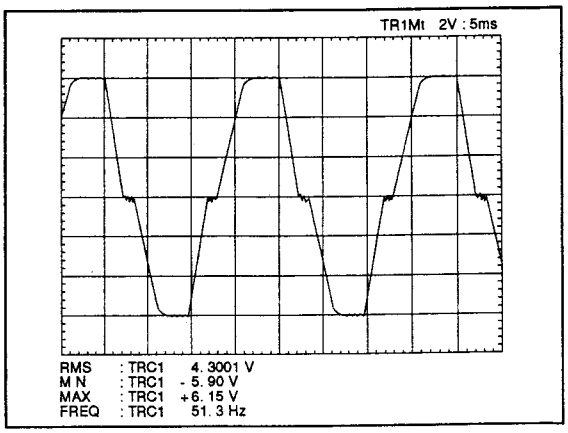
| | | MIN | TYP | MAX |
|---|---|---|---|---|
| Measure on the output between VFIL1 and VFIL2 (AC) | limits are: | 3.69 | 4.1 | 4.51 |

Measure on the output the VFIL (AC) see figure

MINIMUM LOAD



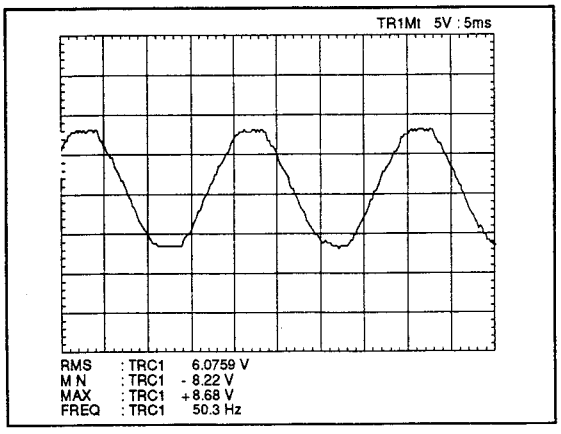

MAXIMUM LOAD



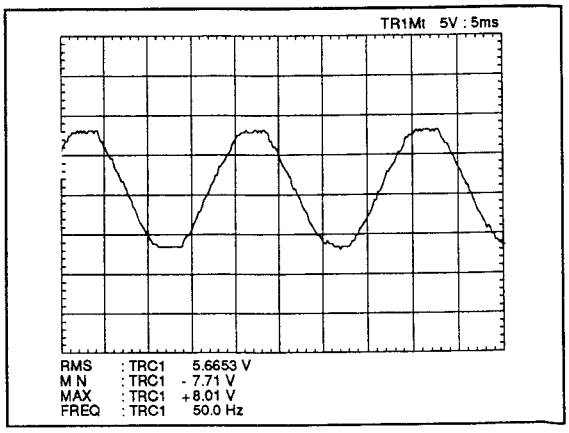

| | | MIN | TYP | MAX |
|---|---|---|---|---|
| Measure on the output between VFIL1R and VFIL2R (AC) | limits are: | 5.0 | 5.5 | 6.0 |

Measure on the output the VFIL_R (AC) see figure

MINIMUM LOAD




MAXIMUM LOAD



Connect a DC voltage of +25V to pin 4 of IC7500 (MC34167)
The load on the +5Volts is 1 Amp.
Connect pin 5 of IC7500 (MC34167) to ground.

Measure the output if the +5 Volts drops to 0.
In case not, there's a big chance that pin 5 of IC7500 (MC34167) makes a bad contact.

### 2.1.2 CONTROLE OF THE OVERVOLTAGE PROTECTION.

Discharge the capacitors on the input pin 4 of IC 7500 (MC34167) : C2502, C2503 and C2504.
Connect a voltage of 10 Volts via a series resistor of 27 ohm minimum 5 Watts to pin 2 of thyristor T6511 or to C2529 or C2530.

Measure if the voltage on C2530 is less than 1 V after 2 seconds. In case the overvoltage protection is not working, the voltage would have been higher than 5 Volts after 2 seconds.

## 2.2 MAINS AND VOLTAGE PROTECTION

### 2.2.1 CONTROL OF THE POFF SIGNAL.

Connect a DC voltage of +25 V to pin 6 of IC7501 (LM339)
The load on the +5 V is 0 Amp.

Measure if the voltage of the POFF signal is +5 V

Connect a DC voltage of +25 Volts to pin 6 of IC7501 (LM339)
The load on the +5 V is 0 Amp.
Short the junction of R3501 and R3502 to ground.

Measure if the voltage of the POFF signal is 0 V after 20 msec.

### 2.2.2 CONTROL OF THE RESET SIGNAL.

Connect a DC voltage of 4.3 Volts to pin 2 and 4 of IC7500 (MC34167)

Measure if the reset signal is low ( < 0.4 V)

Connect a DC voltage of 4.7 Volts to pin 2 and 4 of IC7500 (MC34167)

Measure if the RESET signal stays low for at least 2 ms and after maximum 5 ms goes high after connecting the external DC voltage.

## 1.9 ELECTRICAL PARTS LIST

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| | | | **MONO BOARD (AUDIO PANEL)** |
| | | | **MISCELLANEOUS** |
| 1100 | | 4822 265 10311 | DIGITAL IN/OUT CONN. |
| 1200 | | 4822 265 10482 | YKC21-3071 **(CDR515 ONLY)** |
| 1380 | | 4822 255 40921 | 32-DIP-S-LO |
| 1401 | | 4822 242 10236 | RESONATOR 16 MHz |
| 1581 | | 4822 267 70347 | CON 50P F **(CDR620 ONLY)** |
| 1582 | | 4822 267 70347 | CON 50P F **(CDR620 ONLY)** |
| 1584 | | 4822 276 13286 | SWITCH **(CDR620 ONLY)** |
| ⚠ 4002 | | 4822 051 20008 | 0R (0805) **(CDR620 ONLY)** |
| ⚠ 4003 | | 4822 051 20008 | 0R (0805) **(CDR620 ONLY)** |
| ⚠ 4350 | | 4822 051 20008 | 0R (0805) |
| 5100 | | 4822 242 10228 | CRYSTAL 33.8688 MHz |
| 5210 | | 4822 157 53139 | 4.7UH |
| 5211 | | 4822 157 63315 | COIL |
| 5212 | | 4822 157 63315 | COIL |
| 5320 | | 4822 157 71206 | BLM21A10PT |
| ⚠ 5321 | | | |
| I | | 4822 051 20008 | 0R (0805) |
| ⚠ 5323 | | | |
| 5340 | | 4822 157 70601 | TRANSFORMER |
| 5410 | | 4822 146 10345 | PULSE TRANSFORMER **(CDR620 ONLY)** |
| 5411 | | 4822 146 10345 | PULSE TRANSFORMER **(CDR620 ONLY)** |
| | | | **CAPACITORS** |
| 2000 | | 4822 122 33926 | 12pF 50V |
| 2001 | | 5322 122 32452 | 47pF 5% NP 63V |
| 2002 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2003 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2004 | | 4822 121 51053 | 2nF 1% 250V |
| 2005 | | 5322 122 32452 | 47pF 5% NP 63V |
| 2006 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2007 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2008 | | 4822 122 33926 | 12pF 50V |
| 2009 | | 5322 122 32452 | 47pF 5% NP 63V |
| 2010 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2011 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2012 | | 4822 121 51053 | 2nF 1% 250V |
| 2013 | | 5322 122 32452 | 47pF 5% NP 63V |
| 2014 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2015 | | 5322 122 32531 | 100pF 5% NP 50V |
| ⚠ 2016 | | 4822 124 41579 | 10uF 20% 50V |
| 2017 | | 4822 124 41527 | 47uF 25V |
| 2018 | | 4822 124 41527 | 47uF 25V |
| 2019 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2020 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2021 | | 5322 122 32452 | 47pF 5% NP 63V |
| ⚠ 2022 | | 4822 124 41579 | 10uF 20% 50V |
| 2023 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2024 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2025 | | 4822 124 41527 | 47uF 25V |
| 2026 | | 4822 124 41527 | 47uF 25V |
| 2027 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2028 | | 4822 124 41527 | 47uF 25V |
| 2029 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2030 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2031 | | 4822 124 41527 | 47uF 25V |
| 2032 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2033 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2034 | | 4822 124 41527 | 47uF 25V |
| 2035 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2036 | | 4822 124 41527 | 47uF 25V |
| 2037 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2038 | | 4822 124 41527 | 47uF 25V |
| 2100 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2101 | | 4822 124 41527 | 47uF 25V |
| 2102 | | 4822 124 41527 | 47uF 25V |
| 2103 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2104 | | 4822 124 41527 | 47uF 25V |
| 2105 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2106 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2107 | | 4822 126 10326 | 180pF 5% NP 63V |
| 2108 | | 4822 126 10326 | 180pF 5% NP 63V |
| ⚠ 2109 | | 4822 122 33342 | 33nF 10% X7R 63V |
| 2110 | | 4822 122 33325 | 470nF 16V |
| 2111 | | 4822 124 41527 | 47uF 25V |
| ⚠ 2112 | | 4822 122 33177 | 10nF 20% X7R 50V |
| ⚠ 2113 | | 4822 122 33177 | 10nF 20% X7R 50V |
| 2114 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2115 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ⚠ 2149 | | 4822 122 33342 | 33nF 10% X7R 63V |
| 2151 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ⚠ 2152 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2153 | | 4822 122 33064 | 330nF 80% Y5V 25V |
| ⚠ 2154 | | 5322 122 34123 | 1nF 10% X7R 50V |
| 2156 | | 4822 124 41527 | 47uF 25V |
| 2157 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2158 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2200 | | 4822 124 41527 | 47uF 25V |
| 2201 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2210 | | 4822 124 41527 | 47uF 25V |
| 2211 | | | |
| I | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2213 | | | |
| 2214 | | 4822 124 41527 | 47uF 25V |
| 2215 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ⚠ 2216 | | 4822 124 41579 | 10uF 20% 50V |
| 2217 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2218 | | 4822 124 41527 | 47uF 25V |
| 2219 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ⚠ 2220 | | 4822 124 41579 | 10uF 20% 50V |
| 2221 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2222 | | 5322 122 32658 | 22pF 5% 50V |
| 2223 | | 5322 122 32268 | 470pF 10% 50V |
| 2224 | | 5322 122 32658 | 22pF 5% 50V |
| 2225 | | 5322 122 32268 | 470pF 10% 50V |
| 2226 | | 5322 122 32658 | 22pF 5% 50V |
| 2227 | | 5322 122 32268 | 470pF 10% 50V |
| 2228 | | 5322 122 32658 | 22pF 5% 50V |
| 2229 | | 5322 122 32268 | 470pF 10% 50V |
| 2230 | | 4822 122 33496 | 100nF 10% X7R 63V |

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| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| ⚠ 2231 | | 4822 124 41579 | 10uF 20% 50V |
| 2232 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2233 | | 4822 124 41527 | 47uF 25V |
| 2234 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ⚠ 2235 | | 4822 124 41579 | 10uF 20% 50V |
| 2236 | | 4822 124 41527 | 47uF 25V |
| 2237 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2238 | | | |
| I | | 4822 126 10326 | 180pF 5% NP 63V |
| 2241 | | | |
| 2242 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2243 | | 4822 124 41528 | 100uF 25V |
| 2244 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2245 | | 4822 124 41528 | 100uF 25V |
| 2246 | | 4822 122 31746 | 1000pF 2% NP 63V |
| 2247 | | 4822 122 31746 | 1000pF 2% NP 63V |
| 2248 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2249 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2250 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2251 | | 4822 124 41528 | 100uF 25V |
| 2252 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2253 | | 4822 124 41528 | 100uF 25V |
| 2254 | | 4822 124 22339 | 100uF 16V |
| 2255 | | 4822 124 22339 | 100uF 16V |
| 2300 | | 4822 124 41527 | 47uF 25V |
| 2301 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2302 | | 4822 124 41527 | 47uF 25V |
| 2303 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2304 | | 5322 122 32661 | 56pF 5% 50V |
| 2310 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2311 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2312 | | 4822 124 41527 | 47uF 25V |
| 2313 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2314 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2315 | | 4822 124 41527 | 47uF 25V |
| 2320 | | | |
| I | | 5322 122 32658 | 22pF 5% 50V |
| 2323 | | | |
| 2324 | | 5322 122 32452 | 47pF 5% NP 63V |
| 2325 | | 5322 122 33575 | 220pF 5% NP 50V **(CDR615 ONLY)** |
| 2326 | | 5322 122 33575 | 220pF 5% NP 50V **(CDR615 ONLY)** |
| 2327 | | 5322 122 32452 | 47pF 5% NP 63V |
| 2340 | | | |
| I | | 4822 122 32542 | 47nF 10% X7R 63V |
| 2342 | | | |
| ⚠ 2343 | | 4822 124 41579 | 10uF 20% 50V |
| 2344 | | 5322 122 32659 | 33pF 5% 50V |
| 2345 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ⚠ 2371 | | 5322 122 32654 | 22nF 10% X7R 63V **(CDR615 ONLY)** |
| 2379 | | | |
| I | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2384 | | | |
| ⚠ 2385 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2386 | | | |
| I | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2388 | | | |
| 2389 | | 5322 122 32452 | 47pF 5% NP 63V |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 2390 | | 5322 122 32452 | 47pF 5% NP 63V |
| 2391 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2393 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2394 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2395 | | | |
| I | | 4822 124 41527 | 47uF 25V |
| 2398 | | | |
| 2399 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2400 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2408 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2409 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2410 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2411 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| ⚠ 2412 | | 5322 122 34123 | 1nF 10% X7R 50V **(CDR620 ONLY)** |
| 2413 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2414 | | | |
| I | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2416 | | | |
| 2417 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2418 | | | |
| I | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2420 | | | |
| 2421 | | 4822 122 32139 | 12pF 2% NP 63V **(CDR620 ONLY)** |
| 2422 | | | |
| I | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2424 | | | |
| 2425 | | | |
| I | | 4822 124 41528 | 100uF 25V **(CDR620 ONLY)** |
| 2427 | | | |
| 2428 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2430 | | | |
| I | | 4822 124 22339 | 100uF 16V |
| 2433 | | | |
| 2434 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2435 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2436 | | 4822 122 32139 | 12pF 2% NP 63V |
| 2437 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2438 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2439 | | | |
| I | | 4822 122 32139 | 12pF 2% NP 63V |
| 2441 | | | |
| 2442 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2443 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2444 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2445 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2446 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2447 | | 4822 122 32139 | 12pF 2% NP 63V |
| 2448 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2449 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2450 | | | |
| I | | 4822 122 32139 | 12pF 2% NP 63V |
| 2452 | | | |
| 2453 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2454 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2455 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2456 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2459 | | 4822 122 33496 | 100nF 10% X7R 63V |

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 2460 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2461 | | 5322 122 32531 | 100pF 5% NP 50V |
| 2462 | | | |
| \| | | 4822 124 41528 | 100uF 25V |
| 2469 | | | |
| 2472 | | 4822 124 41527 | 47uF 25V |
| 2473 | | 4822 124 41527 | 47uF 25V |
| 2480 | | | |
| \| | | 4822 124 41528 | 100uF 25V **(CDR620 ONLY)** |
| 2491 | | | |
| 2492 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2493 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2494 | | 4822 122 32139 | 12pF 2% NP 63V **(CDR620 ONLY)** |
| 2495 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2496 | | 4822 122 32139 | 12pF 2% NP 63V **(CDR620 ONLY)** |
| 2497 | | 4822 122 32139 | 12pF 2% NP 63V **(CDR620 ONLY)** |
| 2498 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2499 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2500 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2501 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2502 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2503 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2504 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2505 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2506 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2507 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2508 | | 4822 122 32139 | 12pF 2% NP 63V **(CDR620 ONLY)** |
| 2509 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2510 | | 4822 122 32139 | 12pF 2% NP 63V **(CDR620 ONLY)** |
| 2511 | | 4822 122 32139 | 12pF 2% NP 63V **(CDR620 ONLY)** |
| 2512 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2513 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2514 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2515 | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2516 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2517 | | 4822 122 33496 | 100nF 10% X7R 63V **(CDR620 ONLY)** |
| 2518 | | | |
| \| | | 5322 122 32531 | 100pF 5% NP 50V **(CDR620 ONLY)** |
| 2521 | | | |
| 2522 | | | |
| \| | | 4822 124 22339 | 100uF 16V **(CDR620 ONLY)** |
| 2527 | | | |
| | | | **RESISTORS** |
| 3000 | | | |
| \| | | 4822 117 10358 | 5K6 1% 0.1W |
| 3003 | | | |
| ▲ 3004 | | 4822 051 20109 | 10R 5% 0.1W |
| 3005 | | 4822 117 10358 | 5K6 1% 0.1W |
| 3006 | | 4822 117 10358 | 5K6 1% 0.1W |
| 3007 | | 4822 117 10353 | 150R 1% 0.1W |
| 3008 | | | |
| \| | | 4822 117 10358 | 5K6 1% 0.1W |
| 3011 | | | |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| ▲ 3012 | | 4822 051 20109 | 10R 5% 0.1W |
| 3013 | | 4822 117 10358 | 5K6 1% 0.1W |
| 3014 | | 4822 117 10358 | 5K6 1% 0.1W |
| 3015 | | 4822 117 10353 | 150R 1% 0.1W |
| 3016 | | 4822 117 11503 | 220R 1% 0.1W |
| ▲ 3017 | | | |
| \| | | 4822 117 11152 | 4R7 5% |
| ▲ 3021 | | | |
| 3022 | | 4822 117 11503 | 220R 1% 0.1W |
| 3023 | | 4822 051 20471 | 470R 5% 0.1W |
| 3024 | | 4822 051 20471 | 470R 5% 0.1W |
| ▲ 3100 | | | |
| \| | | 4822 117 11152 | 4R7 5% |
| ▲ 3102 | | | |
| 3103 | | 4822 051 20473 | 47K 5% 0.1W |
| 3104 | | 4822 117 10833 | 10K 1% 0.1W |
| 3105 | | 4822 117 11139 | 1K5 1% 0.1W |
| 3106 | | 4822 051 20274 | 270K 5% 0.1W |
| 3107 | | 4822 117 10833 | 10K 1% 0.1W |
| 3108 | | 4822 051 20273 | 27K 5% 0.1W |
| 3109 | | 4822 117 11507 | 6K8 1% 0.1W |
| ▲ 3110 | | 4822 051 20008 | 0R (0805) |
| 3111 | | 4822 051 20105 | 1M 5% 0.1W |
| 3112 | | 4822 051 20301 | 300R 5% 0.1W |
| 3113 | | 4822 117 12114 | 6K8 2% 0.1W **(CDR615 ONLY)** |
| 3114 | | 4822 051 20272 | 2K7 5% 0.1W |
| 3115 | | 4822 117 11384 | 2K7 1% 0.1W |
| 3116 | | 4822 117 11145 | 4K7 1% 0.1W |
| ▲ 3118 | | 4822 117 11152 | 4R7 5% |
| ▲ 3119 | | 4822 117 11152 | 4R7 5% |
| 3120 | | 4822 051 20331 | 330R 5% 0.1W |
| ▲ 3150 | | 4822 117 11152 | 4R7 5% |
| 3153 | | | |
| \| | | 4822 051 20331 | 330R 5% 0.1W |
| 3157 | | | |
| 3158 | | 4822 051 20473 | 47K 5% 0.1W |
| 3159 | | 4822 051 20331 | 330R 5% 0.1W |
| 3160 | | 4822 051 20271 | 270R 5% 0.1W |
| ▲ 3201 | | 4822 117 11152 | 4R7 5% |
| ▲ 3210 | | 4822 117 11747 | 12R 1206 5% FUSE |
| 3211 | | | |
| \| | | 4822 051 20101 | 100R 5% 0.1W |
| 3213 | | | |
| ▲ 3214 | | 4822 117 11152 | 4R7 5% |
| 3215 | | 4822 117 11539 | 51K 1% 0.1W |
| 3216 | | 4822 117 11539 | 51K 1% 0.1W |
| 3217 | | 4822 117 10507 | 24K 1% 0.1W |
| 3218 | | 4822 117 11539 | 51K 1% 0.1W |
| 3219 | | 4822 117 11539 | 51K 1% 0.1W |
| ▲ 3220 | | 4822 117 11152 | 4R7 5% |
| 3221 | | 4822 051 20101 | 100R 5% 0.1W |
| 3222 | | | |
| \| | | 4822 117 10833 | 10K 1% 0.1W |
| 3227 | | | |
| ▲ 3228 | | 4822 117 11747 | 12R 1206 5% FUSE |

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| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 3229 | | 4822 117 10833 | 10K 1% 0.1W |
| ⚠ 3230 | | 4822 117 11747 | 12R 1206 5% FUSE |
| 3231 | | 4822 117 10833 | 10K 1% 0.1W |
| 3232 | | 4822 117 10358 | 5K6 1% 0.1W |
| 3233 | | 4822 117 10358 | 5K6 1% 0.1W |
| 3234 | | 4822 117 10362 | 7K5 1% 0.1W |
| 3235 | | 4822 117 10362 | 7K5 1% 0.1W |
| 3236 | | 4822 117 10833 | 10K 1% 0.1W |
| 3237 | | 4822 117 10833 | 10K 1% 0.1W |
| 3238 | | 4822 117 10358 | 5K6 1% 0.1W |
| 3239 | | 4822 117 10358 | 5K6 1% 0.1W |
| ⚠ 3240 | | 4822 117 11747 | 12R 1206 5% FUSE |
| ⚠ 3241 | | 4822 117 11747 | 12R 1206 5% FUSE |
| 3242 | | 4822 117 10833 | 10K 1% 0.1W |
| 3243 | | 4822 117 10833 | 10K 1% 0.1W |
| 3260 | | 4822 117 10833 | 10K 1% 0.1W **(CDR615 ONLY)** |
| 3261 | | 4822 051 20473 | 47K 5% 0.1W **(CDR615 ONLY)** |
| 3262 | | 4822 117 10833 | 10K 1% 0.1W **(CDR615 ONLY)** |
| 3263 | | 4822 051 20473 | 47K 5% 0.1W **(CDR615 ONLY)** |
| ⚠ 3264 | | 4822 051 20472 | 4K7 5% 0.1W **(CDR615 ONLY)** |
| ⚠ 3265 | | 4822 051 20472 | 4K7 5% 0.1W **(CDR615 ONLY)** |
| 3266 | | 4822 051 20224 | 220K 5% 0.1W **(CDR615 ONLY)** |
| 3267 | | 4822 051 20224 | 220K 5% 0.1W **(CDR615 ONLY)** |
| 3268 | | 4822 051 20474 | 470K 5% 0.1W **(CDR615 ONLY)** |
| 3269 | | 4822 051 20474 | 470K 5% 0.1W **(CDR615 ONLY)** |
| 3280 | | 4822 051 20473 | 47K 5% 0.1W |
| 3281 | | 4822 051 20104 | 100K 5% 0.1W |
| 3282 | | 4822 051 20473 | 47K 5% 0.1W |
| 3283 | | 4822 117 10833 | 10K 1% 0.1W |
| 3284 | | 4822 051 20473 | 47K 5% 0.1W |
| 3285 | | 4822 051 20104 | 100K 5% 0.1W |
| 3286 | | 4822 051 20122 | 1K2 5% 0.1W **(CDR615 ONLY)** |
| 3287 | | 4822 117 11449 | 2K2 1% 0.1W **(CDR615 ONLY)** |
| 3288 | | 4822 051 20122 | 1K2 5% 0.1W **(CDR615 ONLY)** |
| 3289 | | 4822 117 11449 | 2K2 1% 0.1W **(CDR615 ONLY)** |
| 3290 \| 3293 | | 4822 117 11373 | 100R 1% RC12H 0805 **(CDR615 ONLY)** |
| 3294 | | 4822 117 10833 | 10K 1% 0.1W |
| 3295 | | 4822 051 10102 | 1K 2% 0.25W |
| ⚠ 3300 | | 4822 117 11152 | 4R7 5% |
| ⚠ 3301 | | 4822 117 11152 | 4R7 5% |
| 3302 | | 4822 051 20101 | 100R 5% 0.1W |
| 3304 \| 3306 | | 4822 051 20101 | 100R 5% 0.1W |
| 3310 | | 4822 117 11927 | 75R 1% 0.1W |
| 3311 | | 4822 051 10102 | 1K 2% 0.25W |
| ⚠ 3312 | | 4822 051 20332 | 3K3 5% 0.1W |
| ⚠ 3313 | | 4822 117 11152 | 4R7 5% |
| ⚠ 3314 | | 4822 117 11152 | 4R7 5% |
| 3330 \| 3334 | | 4822 117 10833 | 10K 1% 0.1W |
| 3340 | | 4822 051 20569 | 56R 5% 0.1W |
| 3341 | | 4822 117 11503 | 220R 1% 0.1W |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 3342 | | 4822 117 11503 | 220R 1% 0.1W |
| ⚠ 3343 | | 4822 117 11152 | 4R7 5% |
| 3370 | | 4822 117 10833 | 10K 1% 0.1W **(CDR615 ONLY)** |
| 3371 | | 4822 051 20473 | 47K 5% 0.1W **(CDR615 ONLY)** |
| 3375 | | 4822 051 20223 | 22K 5% 0.1W |
| 3376 | | 4822 051 20223 | 22K 5% 0.1W |
| 3378 | | 4822 051 20223 | 22K 5% 0.1W |
| 3379 | | 4822 051 20223 | 22K 5% 0.1W |
| ⚠ 3380 \| ⚠ 3384 | | 4822 117 11152 | 4R7 5% |
| 3385 \| 3387 | | 4822 117 10833 | 10K 1% 0.1W |
| 3388 | | 4822 051 20105 | 1M 5% 0.1W |
| 3389 \| 3398 | | 4822 117 10833 | 10K 1% 0.1W |
| ⚠ 3404 | | 4822 117 11152 | 4R7 5% |
| ⚠ 3410 \| ⚠ 3413 | | 4822 117 11152 | 4R7 5% **(CDR620 ONLY)** |
| 3414 | | 4822 051 20333 | 33K 5% 0.1W **(CDR620 ONLY)** |
| 3415 | | 4822 051 20682 | 6K8 5% 0.1W **(CDR620 ONLY)** |
| 3416 | | 4822 051 20224 | 220K 5% 0.1W **(CDR620 ONLY)** |
| 3417 | | 4822 051 20394 | 390K 5% 0.1W **(CDR620 ONLY)** |
| 3418 | | 4822 051 20222 | 2K2 5% 0.1W **(CDR620 ONLY)** |
| 3419 | | 4822 051 20332 | 3K3 5% 0.1W **(CDR620 ONLY)** |
| 3420 | | 4822 051 10102 | 1K 2% 0.25W **(CDR620 ONLY)** |
| ⚠ 3421 | | 4822 052 10569 | 56R 5% 0.33W **(CDR620 ONLY)** |
| 3422 | | 4822 051 20103 | 10K 5% 0.1W **(CDR620 ONLY)** |
| 3423 | | 4822 051 20471 | 470R 5% 0.1W **(CDR620 ONLY)** |
| 3424 | | 4822 117 10838 | 110K 1% 0.1W **(CDR620 ONLY)** |
| ⚠ 3425 | | 4822 052 10569 | 56R 5% 0.33W **(CDR620 ONLY)** |
| 3426 | | 4822 051 20473 | 47K 5% 0.1W **(CDR620 ONLY)** |
| ⚠ 3427 | | 4822 117 11152 | 4R7 5% **(CDR620 ONLY)** |
| 3430 | | 4822 117 10837 | 100K 1% 0.1W |
| 3431 | | 4822 117 10837 | 100K 1% 0.1W |
| 3432 | | 4822 117 10352 | 33K 1% 0.2W |
| 3433 | | 4822 117 10833 | 10K 1% 0.1W |
| 3434 | | 4822 117 11536 | 3K3 1% 0.1W |
| 3435 | | 4822 117 11449 | 2K2 1% 0.1W |
| 3436 | | 4822 117 10352 | 33K 1% 0.2W |
| 3437 | | 4822 117 10833 | 10K 1% 0.1W |
| 3438 | | 4822 051 20332 | 3K3 5% 0.1W |
| 3439 | | 4822 117 10833 | 10K 1% 0.1W |
| 3440 | | 4822 117 10362 | 7K5 1% 0.1W |
| 3441 | | 4822 117 10833 | 10K 1% 0.1W |
| 3442 | | 4822 117 10362 | 7K5 1% 0.1W |
| 3443 | | 4822 117 10833 | 10K 1% 0.1W |
| 3444 | | 4822 051 20332 | 3K3 5% 0.1W |
| 3445 | | 4822 117 11449 | 2K2 1% 0.1W |
| 3446 | | 4822 117 10833 | 10K 1% 0.1W |

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| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 3447 | | 4822 051 20332 | 3K3 5% 0.1W |
| 3448 | | 4822 117 10833 | 10K 1% 0.1W |
| 3449 | | 4822 117 10362 | 7K5 1% 0.1W |
| 3450 | | 4822 117 10833 | 10K 1% 0.1W |
| 3451 | | 4822 117 10362 | 7K5 1% 0.1W |
| 3454 | | 4822 051 20471 | 470R 5% 0.1W |
| 3455 | | 4822 051 20471 | 470R 5% 0.1W |
| 3456 | | 4822 117 11141 | 1K8 1% 0.1W |
| 3457 | | 4822 117 11141 | 1K8 1% 0.1W |
| 3458 | | 4822 117 10837 | 100K 1% 0.1W |
| 3459 | | 4822 117 10837 | 100K 1% 0.1W |
| 3460 | | 4822 117 10352 | 33K 1% 0.2W |
| 3461 | | 4822 117 10352 | 33K 1% 0.2W |
| 3462 | | 4822 117 11141 | 1K8 1% 0.1W |
| 3463 | | 4822 117 11141 | 1K8 1% 0.1W |
| ⚠ 3464 | | | |
| \| | | 4822 117 11747 | 12R 1206 5% FUSE |
| ⚠ 3471 | | | |
| 3472 | | 4822 101 11217 | 2K2 25% |
| 3473 | | 4822 101 11217 | 2K2 25% |
| 3480 | | 4822 051 20474 | 470K 5% 0.1W **(CDR620 ONLY)** |
| 3481 | | | |
| \| | | 4822 052 10249 | 24R 5% 0.33W **(CDR620 ONLY)** |
| 3483 | | | |
| 3484 | | 4822 051 20474 | 470K 5% 0.1W **(CDR620 ONLY)** |
| 3485 | | 4822 052 10249 | 24R 5% 0.33W **(CDR620 ONLY)** |
| 3486 | | 4822 117 10357 | 4K3 1% 0.2W **(CDR620 ONLY)** |
| 3487 | | 4822 117 10357 | 4K3 1% 0.2W **(CDR620 ONLY)** |
| 3488 | | 4822 051 20474 | 470K 5% 0.1W **(CDR620 ONLY)** |
| 3489 | | 4822 117 10362 | 7K5 1% 0.1W **(CDR620 ONLY)** |
| 3490 | | 4822 117 11384 | 2K7 1% 0.1W **(CDR620 ONLY)** |
| 3491 | | | |
| \| | | 4822 117 10358 | 5K6 1% 0.1W **(CDR620 ONLY)** |
| 3496 | | | |
| 3497 | | 4822 117 11384 | 2K7 1% 0.1W **(CDR620 ONLY)** |
| 3498 | | 4822 117 11154 | 1K 1% 0.1W **(CDR620 ONLY)** |
| 3499 | | 4822 117 11154 | 1K 1% 0.1W **(CDR620 ONLY)** |
| 3500 | | 4822 052 10249 | 24R 5% 0.33W **(CDR620 ONLY)** |
| 3501 | | 4822 117 10833 | 10K 1% 0.1W **(CDR620 ONLY)** |
| 3502 | | 4822 051 20474 | 470K 5% 0.1W **(CDR620 ONLY)** |
| 3503 | | 4822 052 10249 | 24R 5% 0.33W **(CDR620 ONLY)** |
| 3504 | | 4822 117 10833 | 10K 1% 0.1W **(CDR620 ONLY)** |
| 3505 | | 4822 117 10357 | 4K3 1% 0.2W **(CDR620 ONLY)** |
| 3506 | | 4822 117 10357 | 4K3 1% 0.2W **(CDR620 ONLY)** |
| 3507 | | 4822 051 20474 | 470K 5% 0.1W **(CDR620 ONLY)** |
| 3508 | | 4822 117 10362 | 7K5 1% 0.1W **(CDR620 ONLY)** |
| 3509 | | 4822 117 11384 | 2K7 1% 0.1W **(CDR620 ONLY)** |
| 3510 | | | |
| \| | | 4822 117 10358 | 5K6 1% 0.1W **(CDR620 ONLY)** |
| 3515 | | | |
| 3516 | | 4822 117 11384 | 2K7 1% 0.1W **(CDR620 ONLY)** |
| 3517 | | 4822 117 11154 | 1K 1% 0.1W **(CDR620 ONLY)** |
| 3518 | | 4822 117 11154 | 1K 1% 0.1W **(CDR620 ONLY)** |
| 3519 | | 4822 052 10249 | 24R 5% 0.33W **(CDR620 ONLY)** |
| 3520 | | 4822 117 10833 | 10K 1% 0.1W **(CDR620 ONLY)** |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 3521 | | 4822 051 20474 | 470K 5% 0.1W **(CDR620 ONLY)** |
| 3522 | | 4822 052 10249 | 24R 5% 0.33W **(CDR620 ONLY)** |
| 3523 | | 4822 117 10833 | 10K 1% 0.1W **(CDR620 ONLY)** |
| ⚠ 3524 | | | |
| \| | | 4822 117 11747 | 12R 1206 5% FUSE **(CDR620 ONLY)** |
| ⚠ 3535 | | | |
| | | | **SEMICONDUCTORS** |
| ⚠ 6000 | | 5322 130 33763 | BZX84-C7V5 |
| ⚠ 6001 | | 5322 130 33763 | BZX84-C7V5 |
| 6100 | | 4822 130 31129 | BB212 |
| 6101 | | 4822 130 33996 | BZX84-C9V1 |
| 6280 | | 4822 130 80622 | BAT54 |
| 6400 | | 4822 130 80622 | BAT54 **(CDR620 ONLY)** |
| 6432 | | 4822 130 80125 | BZX84-C5V6 |
| 6433 | | 4822 130 80125 | BZX84-C5V6 |
| 7000 | | | |
| \| | | 5322 209 91079 | OP275GS |
| 7002 | | | |
| 7003 | | 4822 209 12695 | ADMOD79 |
| ⚠ 7004 | | 4822 209 80817 | L7805CV |
| 7005 | | 4822 209 72684 | L7905CV |
| 7100 | | 4822 130 61207 | BC848 (UAW) |
| 7101 | | 5322 209 61487 | LM358N |
| 7102 | | 4822 130 61207 | BC848 (UAW) |
| 7103 | | 4822 209 12696 | TDA1373H/N2 |
| 7104 | | 5322 209 73179 | 74HCT74D |
| 7105 | | 4822 209 33465 | 74HCT4046AD |
| 7150 | | 4822 209 33395 | TDA1315H/N2 |
| 7200 | | 4822 209 12697 | SM5841AS |
| 7210 | | 4822 209 31356 | SAA7350AGP |
| 7211 | | 5322 209 91079 | OP275GS |
| 7212 | | 5322 209 91079 | OP275GS |
| 7260 | | 4822 130 61207 | BC848 (UAW) **(CDR615 ONLY)** |
| 7261 | | 4822 130 61207 | BC848 (UAW) **(CDR615 ONLY)** |
| 7262 | | 5322 130 41983 | BC858 (UAW) **(CDR615 ONLY)** |
| 7263 | | 5322 130 41983 | BC858 (UAW) **(CDR615 ONLY)** |
| 7264 | | 4822 130 42633 | BSR56 **(CDR615 ONLY)** |
| 7265 | | 4822 130 42633 | BSR56 **(CDR615 ONLY)** |
| 7280 | | 4822 130 61207 | BC848 (UAW) |
| 7281 | | 4822 130 61207 | BC848 (UAW) |
| 7282 | | 5322 130 42012 | BC858 (UAW) |
| 7283 | | | |
| \| | | 4822 130 42696 | BC818-25 **(CDR615 ONLY)** |
| 7286 | | | |
| 7300 | | 4822 209 60792 | 74HC4053D |
| 7301 | | 4822 209 12698 | MC74HC125AD |
| 7310 | | 5322 209 11517 | PC74HCU04T |
| 7311 | | 4822 209 60792 | 74HC4053D |
| 7340 | | 5322 209 31284 | SN74ALS08D **(CDR620 ONLY)** |
| 7370 | | 4822 130 61207 | BC848 (UAW) **(CDR615 ONLY)** |
| 7380 | | 4822 900 10974 | EPROM **(CDR620)** |
| 7380 | | 4822 900 10972 | EPROM **(CDR615)** |
| 7381 | | 4822 209 30724 | MC74HC374ADW |
| 7382 | | 4822 209 12709 | MC68HC11K4- |

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| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 7383 | | 5322 209 60299 | 74HCT00D |
| 7384 | | 4822 209 60792 | 74HC4053D |
| 7385 | | | |
| \| | | 4822 209 31284 | MC74HC08AD |
| 7387 | | | |
| 7390 | | 5322 209 11596 | 74HCT08D |
| 7391 | | 5322 209 60299 | 74HCT00D |
| 7392 | | 4822 209 12712 | KM6264BLG-7 |
| 7393 | | 4822 209 30724 | MC74HC374ADW |
| 7394 | | 4822 209 31284 | MC74HC08AD |
| 7410 | | 5322 209 11517 | PC74HCU04T **(CDR620 ONLY)** |
| 7411 | | 5322 209 60472 | SN75157P **(CDR620 ONLY)** |
| 7412 | | 5322 209 61482 | MC74HC4066D **(CDR620 ONLY)** |
| 7413 | | 4822 209 12719 | CS8402A-CS **(CDR620 ONLY)** |
| 7414 | | 4822 209 30721 | MC74HC74AD **(CDR620 ONLY)** |
| 7430 | | 4822 209 60792 | 74HC4053D |
| 7431 | | 4822 209 60792 | 74HC4053D |
| 7432 | | | |
| \| | | 4822 209 32002 | NJM5532MD |
| 7435 | | | |
| 7480 | | 5322 209 86463 | NE5534D **(CDR620 ONLY)** |
| 7481 | | 5322 209 86463 | NE5534D **(CDR620 ONLY)** |
| 7482 | | | |
| \| | | 4822 209 32002 | NJM5532MD **(CDR620 ONLY)** |
| 7485 | | | |
| 7486 | | | |
| \| | | 4822 130 42633 | BSR56 **(CDR620 ONLY)** |
| 7491 | | | |
| | | | **DISPLAY BOARD (DISPLAY PANEL)** |
| | | | **MISCELLANEOUS** |
| 1900 | | 4822 242 81002 | CST6.00MGW-TF01 |
| 1920 | | | |
| \| | | 4822 276 13114 | TACT SWITCH |
| 1925 | | | |
| 1927 | | | |
| \| | | 4822 276 13114 | TACT SWITCH |
| 1932 | | | |
| 1935 | | | |
| \| | | 4822 276 13114 | TACT SWITCH |
| 1938 | | | |
| ▲ 4900 | | 4822 051 20008 | 0R (0805) |
| | | | **CAPACITORS** |
| 2900 | | | |
| \| | | 5322 124 21643 | 22uF 20% 40V |
| 2902 | | | |
| ▲ 2903 | | 5322 126 13187 | 22nF 100V |
| ▲ 2904 | | 5322 126 13187 | 22nF 100V |
| 2905 | | 4822 122 10177 | 10nF 20% 25V |
| 2906 | | 4822 122 10177 | 10nF 20% 25V |
| | | | **RESISTORS** |
| ▲ 3900 | | 4822 050 23301 | 330R 1% 0.6W |
| ▲ 3901 | | 4822 050 23301 | 330R 1% 0.6W |
| ▲ 3902 | | 4822 050 24703 | 47K 1% 0.6W |
| ▲ 3903 | | 4822 050 24703 | 47K 1% 0.6W |
| 3904 | | | |
| \| | | 4822 050 22203 | 22K 1% 0.6W |
| 3908 | | | |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| ▲ 3909 | | 4822 050 24703 | 47K 1% 0.6W |
| 3910 | | 4822 116 52235 | 1M 5% 0.5W |
| ▲ 3911 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3912 | | 4822 050 22203 | 22K 1% 0.6W |
| ▲ 3913 | | 4822 050 21002 | 1K 1% 0.6W |
| 3914 | | 4822 051 10102 | 1K 2% 0.25W |
| ▲ 3915 | | 5322 111 90473 | RES.NETWORK |
| ▲ 3916 | | 5322 111 90473 | RES.NETWORK |
| ▲ 3917 | | | |
| \| | | 4822 052 10478 | 4R7 5% 0.33W |
| ▲ 3919 | | | |
| | | | **SEMICONDUCTORS** |
| 6900 | | 4822 130 10052 | GL5ED44 |
| 6902 | | 4822 130 30613 | BAW62 |
| 6904 | | | |
| \| | | 4822 130 30613 | BAW62 |
| 6908 | | | |
| 7900 | | 4822 135 00002 | BJ379GK DISPLAY |
| 7901 | | 4822 209 31251 | TMP47C670P-FTDD007 |
| 7902 | | 4822 209 31623 | MSL915 |
| 7903 | | 4822 209 31623 | MSL915 |
| 7904 | | 4822 130 44121 | BC338 |
| 7905 | | 4822 130 44121 | BC338 |
| | | | **HEAD PHONE BOARD (HP PANEL)** |
| | | | **MISCELLANEOUS** |
| 1651 | | 4822 267 31453 | HEAD PHONE JACK |
| ▲ 4000 | | 4822 051 20008 | 0R (0805) |
| ▲ 4001 | | 4822 051 20008 | 0R (0805) |
| ▲ 4603 | | 4822 051 20008 | 0R (0805) |
| | | | **CAPACITORS** |
| 2650 | | 4822 124 41528 | 100uF 25V |
| 2651 | | 4822 124 41528 | 100uF 25V |
| ▲ 2652 | | 5322 122 34123 | 1nF 10% X7R 50V |
| ▲ 2653 | | 5322 122 34123 | 1nF 10% X7R 50V |
| ▲ 2654 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2655 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2656 | | 5322 122 34123 | 1nF 10% X7R 50V |
| | | | **RESISTORS** |
| 3650 | | 4822 051 20104 | 100K 5% 0.1W |
| 3651 | | 4822 116 52234 | 100K 5% 0.5W |
| 3652 | | 4822 117 11373 | 100R 1% RC12H 0805 |
| ▲ 3653 | | 4822 051 20121 | 120R 5% 0.1W |
| 3654 | | 4822 117 11383 | 12K 1% 0.1W |
| 3655 | | 4822 051 20273 | 27K 5% 0.1W |
| 3656 | | 4822 117 11373 | 100R 1% RC12H 0805 |
| 3657 | | 4822 117 11383 | 12K 1% 0.1W |
| 3658 | | 4822 050 21201 | 120R 1% 0.6W |
| 3659 | | 4822 051 20273 | 27K 5% 0.1W |
| ▲ 3660 | | 4822 117 11747 | 12R 1206 5% FUSE |
| ▲ 3661 | | 4822 117 11747 | 12R 1206 5% FUSE |
| 3662 | | 4822 101 21199 | 10KX2 20% 0.025W |
| | | | **SEMICONDUCTORS** |
| 7650 | | 4822 130 42633 | BSR56 |
| 7651 | | 4822 130 42633 | BSR56 |
| 7652 | | 4822 209 82362 | NJM4556AD |

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| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| | | | **LEVEL BOARD (VOL. PANEL)** |
| | | | **CAPACITORS** |
| 2600 | | | |
| \| | | 4822 124 22339 | 100uF 16V |
| 2603 | | | |
| ⚠ 2604 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ⚠ 2605 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2606 | | 4822 124 41527 | 47uF 25V |
| 2607 | | 4822 124 41527 | 47uF 25V |
| | | | **RESISTORS** |
| 3600 | | 4822 117 11437 | 8K2 1% 0.1W |
| 3601 | | 4822 117 11188 | 20K 1% 0.1W |
| 3602 | | 4822 117 11188 | 20K 1% 0.1W |
| 3603 | | 4822 117 11437 | 8K2 1% 0.1W |
| 3604 | | 4822 117 10833 | 10K 1% 0.1W |
| 3605 | | 4822 117 10833 | 10K 1% 0.1W |
| ⚠ 3606 | | 4822 117 11747 | 12R 1206 5% FUSE |
| ⚠ 3607 | | 4822 117 11747 | 12R 1206 5% FUSE |
| 3608 | | 4822 101 11347 | POTM. LOG. 2X20K |
| | | | **SEMICONDUCTORS** |
| 7600 | | 5322 209 91079 | OP275GS |
| 7601 | | 5322 209 91079 | OP275GS |
| | | | **POWER SUPPLY BOARD** |
| | | | **MISCELLANEOUS** |
| ⚠ 1500 | | 4822 265 20492 | FN326-1/02 |
| ⚠ 1501 | | 4822 070 31002 | FUSE HOLDER |
| 1503 | | 4822 277 11483 | VOLTAGE SELECTOR |
| ⚠ 1504 | | 4822 252 51186 | 19398E1(2.0A) |
| ⚠ 1508 | | 4822 276 13224 | SWITCH |
| ⚠ 1509 | | 4822 252 51186 | 19398E1(2.0A) |
| ⚠ 4002 | | 4822 051 20008 | 0R (0805) |
| ⚠ 4003 | | 4822 051 20008 | 0R (0805) |
| 5500 | | 4822 146 10346 | DC/DC CONVERTER TRAF |
| 5502 | | 5322 157 52513 | COIL |
| 5503 | | 4822 146 10347 | DC/DC CONVERTER TRAF |
| | | | **CAPACITORS** |
| ⚠ 2500 | | 4822 121 70479 | 100nF 10% 250V |
| ⚠ 2501 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2502 | | 4822 124 22427 | 47uF 20% 40V |
| 2503 | | | |
| \| | | 4822 124 11474 | 2200uF 20% 50V |
| 2505 | | | |
| 2506 | | 5322 122 31866 | 6.8nF 10% X7R 63V |
| 2507 | | 4822 122 33891 | 3.3nF 10% X7R 63V |
| 2509 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ⚠ 2511 | | 5322 122 32654 | 22nF 10% X7R 63V **(CDR615 ONLY)** |
| ⚠ 2512 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2513 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ⚠ 2514 | | 5322 122 34123 | 1nF 10% X7R 50V |
| 2515 | | 4822 124 80259 | 1000uF 20% 25V |
| ⚠ 2516 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2517 | | 4822 124 22427 | 47uF 20% 40V |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| ⚠ 2518 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ⚠ 2523 | | 5322 122 34123 | 1nF 10% X7R 50V |
| 2524 | | 4822 124 80259 | 1000uF 20% 25V |
| ⚠ 2525 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2526 | | 4822 124 22427 | 47uF 20% 40V |
| ⚠ 2527 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2529 | | 4822 124 40201 | 1000uF 20% 16V |
| 2530 | | 4822 124 40201 | 1000uF 20% 16V |
| 2531 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ⚠ 2532 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2533 | | 4822 124 23172 | 470uF 20% 50V |
| 2534 | | 4822 124 22427 | 47uF 20% 40V |
| ⚠ 2535 | | 4822 126 10454 | 3.3nF 20% 400V |
| ⚠ 2536 | | 5322 122 32654 | 22nF 10% X7R 63V |
| | | | **RESISTORS** |
| 3501 | | 4822 117 10833 | 10K 1% 0.1W **(CDR615 ONLY)** |
| 3502 | | 4822 117 10833 | 10K 1% 0.1W **(CDR615 ONLY)** |
| 3503 | | 4822 051 10102 | 1K 2% 0.25W |
| 3504 | | 4822 051 20473 | 47K 5% 0.1W |
| 3505 | | 4822 117 10833 | 10K 1% 0.1W |
| 3506 | | 4822 117 10833 | 10K 1% 0.1W |
| 3507 | | 4822 051 20104 | 100K 5% 0.1W |
| 3508 | | 4822 117 10833 | 10K 1% 0.1W |
| 3509 | | 4822 051 20683 | 68K 5% 0.1W |
| 3510 | | 4822 051 20682 | 6K8 5% 0.1W |
| 3511 | | 4822 051 20224 | 220K 5% 0.1W |
| 3514 | | 4822 117 10833 | 10K 1% 0.1W **(CDR615 ONLY)** |
| 3515 | | 4822 051 20223 | 22K 5% 0.1W **(CDR615 ONLY)** |
| 3516 | | 4822 116 52234 | 100K 5% 0.5W **(CDR615 ONLY)** |
| 3517 | | 4822 051 10102 | 1K 2% 0.25W **(CDR615 ONLY)** |
| 3518 | | 4822 051 20334 | 330K 5% 0.1W **(CDR615 ONLY)** |
| 3519 | | 4822 117 11154 | 1K 1% 0.1W |
| 3520 | | 4822 117 11154 | 1K 1% 0.1W |
| 3521 | | 4822 117 10833 | 10K 1% 0.1W **(CDR615 ONLY)** |
| 3522 | | 4822 051 20474 | 470K 5% 0.1W **(CDR615 ONLY)** |
| 3523 | | 4822 117 10833 | 10K 1% 0.1W **(CDR615 ONLY)** |
| 3524 | | 4822 051 20474 | 470K 5% 0.1W **(CDR615 ONLY)** |
| 3525 | | 4822 117 10833 | 10K 1% 0.1W **(CDR615 ONLY)** |
| 3526 | | 4822 117 10833 | 10K 1% 0.1W |
| 3528 | | 4822 051 20561 | 560R 5% 0.1W |
| ⚠ 3529 | | 4822 051 20472 | 4K7 5% 0.1W |
| ⚠ 3530 | | 4822 051 20472 | 4K7 5% 0.1W |
| ⚠ 3532 | | 4822 117 11744 | 0R22 5% 1W |
| 3533 | | 4822 050 26802 | 6K8 1% 0.6W |
| ⚠ 3534 | | 4822 050 24703 | 47K 1% 0.6W |
| 3535 | | 4822 051 10102 | 1K 2% 0.25W |
| 3536 | | 4822 051 10102 | 1K 2% 0.25W |
| 3538 | | 4822 051 20122 | 1K2 5% 0.1W |
| | | | **SEMICONDUCTORS** |
| ⚠ 6500 | | | |
| \| | | 4822 130 31982 | BYV27-100 |
| ⚠ 6503 | | | |
| ⚠ 6504 | | 4822 130 30621 | 1N4148 (COL) |
| ⚠ 6505 | | 4822 130 30621 | 1N4148 (COL) |

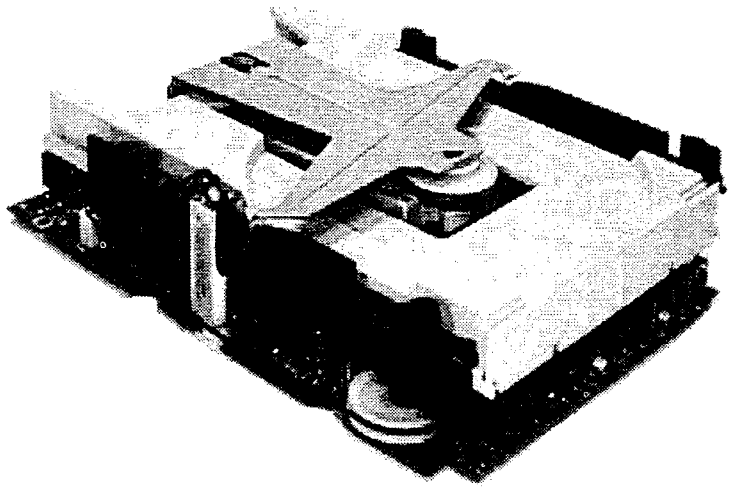
(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 6506 | | 4822 130 81274 | MBR745 |
| ⚠ 6507 | | 4822 130 31982 | BYV27-100 |
| ⚠ 6509 | | 4822 130 31982 | BYV27-100 |
| 6512 | | 4822 130 34174 | BZX79-C4V7 (COL) |
| ⚠ 6513 | | 4822 130 61219 | BZX79-C1 (COL) |
| 6514 | | 4822 130 30862 | BZX79-C9V1 (UAW) |
| 6515 | | 4822 130 34382 | BZX79-C8V2 (COL) |
| ⚠ 6516 | | | |
| I | | 5322 130 30684 | 1N4002GP |
| ⚠ 6519 | | | |
| 6520 | | 4822 130 34278 | BZX79-C6V8 (COL) |
| ⚠ 6521 | | 4822 130 30621 | 1N4148 (COL) |
| 6522 | | 4822 130 34278 | BZX79-C6V8 (COL) |
| ⚠ 6523 | | 5322 130 30684 | 1N4002GP |
| ⚠ 6524 | | 5322 130 30684 | 1N4002GP |
| ⚠ 6526 | | 4822 130 30621 | 1N4148 (COL) |
| 6529 | | 4822 130 34195 | BZX79-B13 |
| ⚠ 6530 | | 4822 130 30621 | 1N4148 (COL) |
| 7500 | | 4822 209 32063 | MC34167TV |
| 7501 | | 5322 209 70684 | LM339D |
| 7502 | | 4822 209 73492 | L7912CV |
| 7503 | | 4822 130 10057 | BUK545-100A |
| ⚠ 7505 | | 4822 209 81726 | L7812CV |
| 7506 | | 4822 209 33433 | MC34064P-5 |
| 7507 | | 4822 209 12715 | L7915CV |
| 7508 | | 5322 130 44593 | BC369 |
| 7509 | | 5322 130 44593 | BC369 |
| ⚠ 7510 | | 5322 130 41982 | BC848B (UAW) |
| ⚠ 7511 | | 5322 130 41982 | BC848B (UAW) |

# Service Manual

**CDD2000**

**CDR Module**



**CAUTION: This part is instluction for Central repair center only.**
**Do not repair at local Service agent.**
**Please contact to MARANTZ JAPAN INC., MARANTZ EUROPE B.V. or SUPERSCOPE TECHNOLOGIES, INC, for Central repair procedure.**

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# model CDD2000

## 2.1 LIST OF ABBREVIATIONS

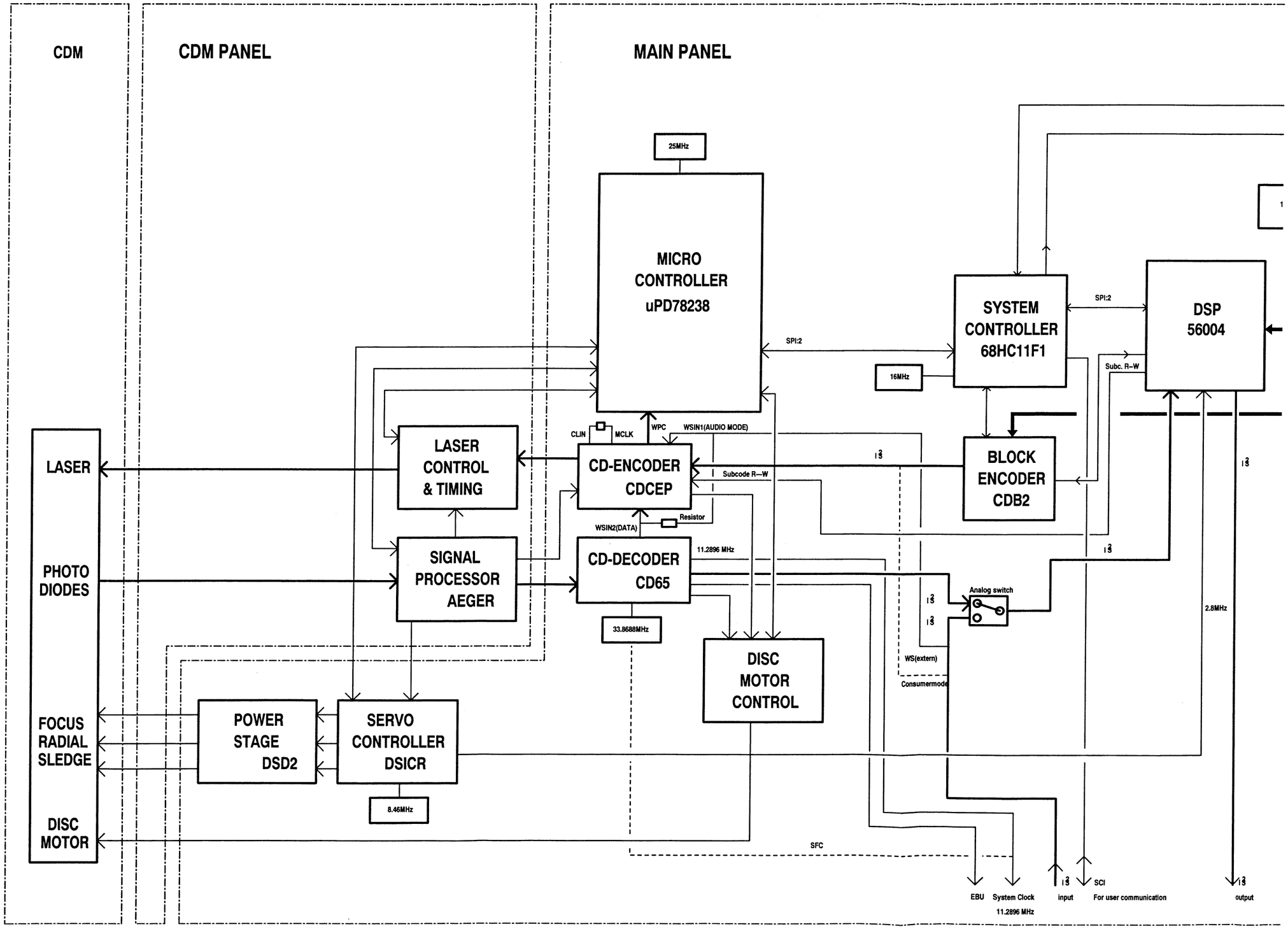
A1 : Calculation β and HFO
A2 : Beta = (A1-A2)/(A1+A2)
ACA : Access Allowed signal
ACK : Acknowledge serial communication user µP
ACKA : Port 'A' acknowledge
ACKB : Port 'B' acknowledge
AINT : ALPHA integrator
ALFA : Actual absorption
ALFALS : Absorption loop switch
ALFA0 : Absorption set value from µP max 4.0V (0 ... 255 DAC)
ALFA3 : Absorption error detection
ALFAC : Absorption during writing
ALLOWERR : Allow Error
ALON : Alpha loopswitch on
ALS : Alpha loopswitch
AMON : Alpha Measurement ON
AREF : Sample value of AINT
ASTROBE : Absorption strobe
ASY : Interrupt request for reading Atip
ATTADS : Attention scsi-bus
ATTBE : Attention signal
AZIN . + in for ALPHAO
AZREF : - in for ALPHAO
A1 : Positive peak detector between CA and CALF
A2 : Negative peak detector between CA and CALF
A0 .. 16 : Address bus
BARCODE : Barcode signal
BSY : Busy (SCSI input signal)
BTARG : Potmeter for beta target ADC for beta correction adjustment input to µP
CA : Central Aperture (C1+C2+C3+C4) DC -> for Mod. calculation
CAGAIN : Power input for amplification factor of CA for servo signals
CAHFE : CA High frequency
CALF : CA low frequency
CALPF : CA low pass filter
CDMLAS : high/low power laser (jumper on laser PCB)
CECS : Chip select CDCE
CEFS : EFM frame sync
CEPB : Subcode P-channel input
CERES : Reset CDCE
CERS : Register select CDCE
CESSY : Subcode sync
CE INT : CDCEP interrupt
CFLAG : Correction flag output (CD65)
CLCE : µC clock output encoder (CDCEP)
CLD : I²S clock
CLDE : µC clock output decoder (CD65)
CLDS : µC clock output DSICR
CLIN : I²S clock input (CDCEP)
CLKIN : clock signal
CLOUT : I²S bitclock output (CD65)
CLWP : µC clock Atip information CDCEP
COMCLK : Communication clock from user µP
CSADS : ADS-SCSI chip select
CSCDBD : chipselect CDBD
CSCDBE : chipselect CDBE
CSGAIN : Amplification factor alpha and beta measurement
C D : Command/Data (Bidirectional SCSI signal)
C1 ... 4 : Main spots
DACE : µC data I/O CPCEP
DAD : I²S data
DADE : µC data CDLIP
DADS : µC data I/O DSICR
DAIN : Data signal (CDCEP)
DAZFA : See FS Limit
DAOUT : I²S data output (CD65)
DAWP : µC data Atip information (CDCEP)
DA0 ... 8 : Buffer address
DB0 ... 8 : SCSI data bus
DPH : Delta P 20% active low, default high
DPL : Delta P 10% active low, default high
DSSY : Decoder subcode sync
D0 ... 7 : Data bus bit 0-7

E : E-clock microcontroller (2MHz)
EBU : Digital output
EFIN : Error flag signal
EFM : Eight to fourteen modulation 2: CDCEP output for monitoring (reduced voltage from CD65 to MONON)
EFMM : EFM N-1
EFMCLK : EFM clock 4.3218 or 8.6436 MHz
EFMD : Eight to fourteen modulation detect
EFOUT : Error flag output CDROM (CD65)
EFS : EFM flame sync output (CDCEP)
ENINT : Enable interrupt
ERON : Error on (servo)
ERROR : Led indicating an error
ERRPWM : Motor control signal input
ERR I/O : Error input/output
FEN : Focus error normalized = (C1+ C3-C2-C4)/C1+C2+C3+C4)
FOC+, FOC- : Focus actuator
FS : FS=FSO-DALFA (write power to laser control)
FSCDM1 .. 2 : Controlled forward sense sensitivity
FSF : Write power filtered (FS filtered)
FSLIMIT : Control of DALPHA if FS>+4.3V diff of ALPHO and ALFAC
FSO : Forward sense diode reference current (write power setting from µP 4.3V=DAC 0 ... 255)
GAIN : 12cm or 8cm recordable disc (µC)
HCA1..2 : Peak detector A1, A2
HF : High frequency reading signal after MTF equalizing
HMSW : Home switch
H0 ... 7 : Host data bus
INTADS : Interrupt request ADS
INTSEL : Integrator to opamp or Vref (µC)
IPPN : Current PPN
IREAD : Laser read current
IWRITE : Laser write current
IX : Current X
I-O : Input/output (bidirectional SCSI signal)
LASPOR : Switch function (Laser current 40% higher; H=2 = high and CDM LAS = high)
LASWR : Laser write/read
LDCE : µC load input (from CDCEP)
LDDE : µC load output decoder
LDDS : µC load output DSICR
LDON : Laser diode on (on read)
LOCK : Lock signal from decoder
LWRT : Laser at writing power
MCKN : Master clock not
MCLK : Bit clock output (CDCEP)
MCSEL : Motor control selection
MCSSEL : Motor control signal select
MCTRL : Motor control switch (wobble/decoder)/tacho (µC)
MERR : Motor control error signal
MIRN : Mirror normalized
MONEN : Monitor function
MONON : Monitoring EFM from CDCEP to CD65
MOT : Spindle motor signal
MOTOFF : Motor off
MREF : PWM output tacho
MSG : Message (bidirectional SCSI signal)
NEGAIN : Amplification factor fault signals and beta measurement
NIRQ : Interrupt request wobble processing (CDCEP)
NRSMP : None read sample (active low) during EFM
NRQ : Interrupt request CDBE
N2 : N=high (double speed)
N2N : Switch for wobble filter
OTD : Off track detection DISCR
PMON : Power monitoring laser (warning to µP when FS > 4.3V)
POWOK : Writing power ok
PP : XB or PPN (read or write)
PPN : Normalized push pull signal
PPULS : Data P pulse timing
PWR OFF : Power off detection input from user
QCL : Q-channel clock
QDA : Q-channel data
QRA : Q-channel request acknowledge
RAD+, RAD- : Radial actuator
RADINT : Radial actuator integrator voltage
RA0 ... 8 : Ram address bus (CDB2)

RD : Read puls
RDA0 ... 7 : Ram data bus (CDB2)
READY : Led indicating drive ready
REN : Radial error normalized
RESEN : Reset CDCEP from µP
RESET : Reset from µP to DSICR and CD6
RESDEC : Reset decoder CXD2500Q
REQ : Request (SCSI input signal)
REQA : Port'A' request
REQB : Port'B' request
RINTOFF : Read integrator off (control Read current to Laser)
RINTON : Read integrator on
RSTADS : Reset ADS-chip
RSTIN : Reset micro controller (from user)
RW : Read/write
RXD : Receive data input (testing only)
R-W : UP read/write signal
SACK : Service acknowledge
SDAT : Servo data
SDB0 ... 8 : SCSI data bus
SDGAIN : Current to control the grating ratio of the satellite spots to the main spots
SEL : Select (SCSI input signal)
SI : Serial data communication user
SL+, SL- : Sledge motor
SO : Serial communication data output to user µP
SPEED : Speed selection N=1/N=2
SPMOT : Spindle motor
SREQ : Servo request
SRST : Servo reset
SRSTMP : Reset servo microcontroller
SSY : Subcode sync output CDCEP
STEFM : Switch EFM tom disc/EFM tom CDCE
STOPM : Stop motor switch
SUMREF : Minimal power where above the normalizing works for servo signals
SWRT : Start write 9µs (one shot at start up LWRT)
SYSCLOCK : System clock
S1,S2 : Satellite spots
TACHPLS : Tacho puls input CDM
TLN : Track loss normalized
TRIN : Tray in switch
TRMOT : Tray motor control
TROUT : Tray out switch
TRS1 : Tray switch input
TRS2 : Tray switch input
TXD : Transmit data output (testing only)
UCL : Serial data transfer clock
UDAT : Serial data from CPU
ULAT : Serial data latch puls
VREF : Typical 2.5V
WINTOFF : Write integrator off (control write current to laser)
WINTON : Write integrator on
WOBL : Digital wobble after wobble filter and slicer (CDCEP to µC)
WP0 : µP osc. input NOT USED!
WP1 : µP osc. input NOT USED!
WPCS : Chip select WPC
WPDEC : Motor control switch wobble/decoder
WRITE : Led indicating writing
WR : Write puls
WRLASER : Write/read laser, laser is switched with EFM timing (EFM N-1)
WRO : Selection write port 0
WRI : Selection write port 1
WSENC : Word select output from encoder (master) CDCEP
WSIN : Word select signal CDCEP
SWOUT : $I^2S$ wordselect output (CD65)
X : Fault signal X, not filtered and not normalized
XB : X balanced
XDN : X detection normalized
XFER : Indicating actual data transferring
XIRQ : Non maskable interrupt to microcontroller
XTAL : 16MHz clock output to DAC (CD65)
Y : Fault signal Y, not filtered and not normalized
4A0 ... 10 : Ram address bus (CDCE)
4M : 4x buffered clock (8MHz)
4RD0 ... 7 : Ram data bus (CDCE)

## 2.2 BLOCK DIAGRAM

# BLOCK DIAGRAM CDD2000-MODULE



ODULE

MAIN PANEL

25MHz

MICRO CONTROLLER uPD78238

SPI:2

16MHz

SYSTEM CONTROLLER 68HC11F1

SPI:2

DSP 56004

1 MB DRAM

DATA 0 - 7

16MHz

SCSI CONTROLLER 53CF92

SCSI INTERFACE FROM/TO HOST

SCSI CONTROL

SCSI DATA TRANCEIVERS

TERMINATORS

DATA 0 - 7

Subc. R–W

CLIN

MCLK

WPC

WSIN1(AUDIO MODE)

LASER CONTROL & TIMING

CD-ENCODER CDCEP

Subcode R—W

BLOCK ENCODER CDB2

Resistor

WSIN2(DATA)

SIGNAL PROCESSOR AEGER

CD-DECODER CD65

11.2896 MHz

Analog switch

2.8MHz

33.8688MHz

DISC MOTOR CONTROL

WS(extern)

Consumermode

RVO TROLLER DSICR

8.46MHz

SFC

POWER SUPPLY

-8V

+12V

EBU

System Clock 11.2896 MHz

input

SCI

For user communication

output

## 2.3 SCHEMATIC DIAGRAM AND PARTS LOCATION

SERVO PART

ATMOT CLWP EEDA LWRT NIRQ RSTMP
CA DACE EFMCLK MONON NRSMP SCAN
CE_INT DADE EFMM MOTO2 PP SWRT
CLCE DAWP LDCE N2 RESEN
CLDE EECL LDDE N4 RESET

PAGE 2 ENCODING & DECODING PART

ACK COMSYC
BARCODE RSTIN SO
COMCLK SI SYSSYNC

PAGE 3 USER CONTROL PART

CLODS EFEN POWER_OFFSI

PAGE 4 BLOCK DECODING & ENDECODING PART

ATMOT CLWP EEDA LWRT NIRQ
CA DACE EFMCLK MONON NRSMP
CE_INT DADE EFMM MOTO2 PP RSTMP
CLCE DAWP LDCE N2 RESEN SCAN
CLDE EECL LDDE N4 RESET SWRT

PAGE1 SERVO PART
CL11

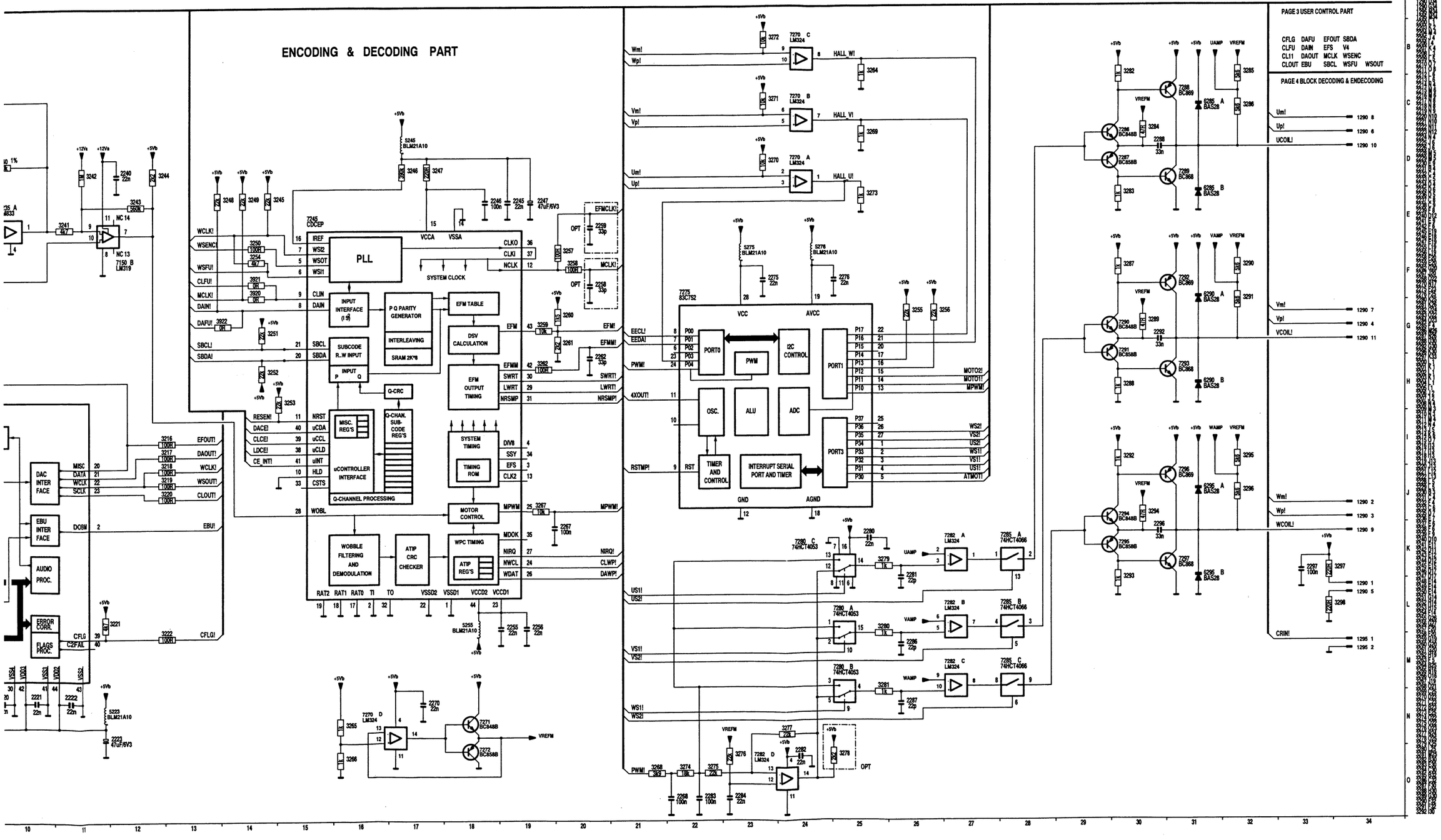
## ENCODING & DECODING PART

7210
CD60

2 - 11

2 - 12

## ENCODING & DECODING PART



ACK COMSYC
BARCODESI SO
COMCLK RSTIN SYSSYNC

PAGE 1 SERVO PART

4XOUT

PAGE 2 ENCODING & DECODING PART

ST1 ID0! ID1! ID2!

7330
M68HC11_F1

OPTION
5330 BLM21A10
2331 33u/6V3 25V
2330 100n
VDD

TIMER
07/16
06/15
TCK
PULSE ACCUMULATOR
PERIODIC INTERRUPT
COP WATCHDOG
OC1
PIA
OC2
OC3
OC4
OCS/14
IC1
IC2
IC3

512 BYTES EEPROM

A/D

SPI
SS
SCK
MOSI
MISO

SCI

CPU

CHIP SELECT

INTERRUPTS

OSCILLATOR

MODE CONTROL

1024 BYTE STATIC RAM

ADDRESS BUS

DATA BUS

CONTROL

PORT A
PORT B
PORT C
PORT D
PORT E
PORT F
PORT G

N.C
VRH
VRL
RESET
XIRQ
IRQ
XTAL
EXTAL
4XOUT
E
MODA
MODB
VSS
R/W

ACA!
PARON!
BARCODE!
RESETN!
INTSCSIN!
4XOUT!
E!

1331 SW1 OPEN/CLOSE

7305 MC34064 RESET GND

3343 1M 16MHz

3344 100R
3345 100R

DSPIRON!
SPIDSPN!
COMSYC!
ACK!
SYSSYNC!
VPPE!
SPICLK!
SI!
MISO!
WRITE!
READY!
CSSCSIN!
ERROR!
RSTDSPN!
RSTSCSI!
RSTIN!
CSCDB2!

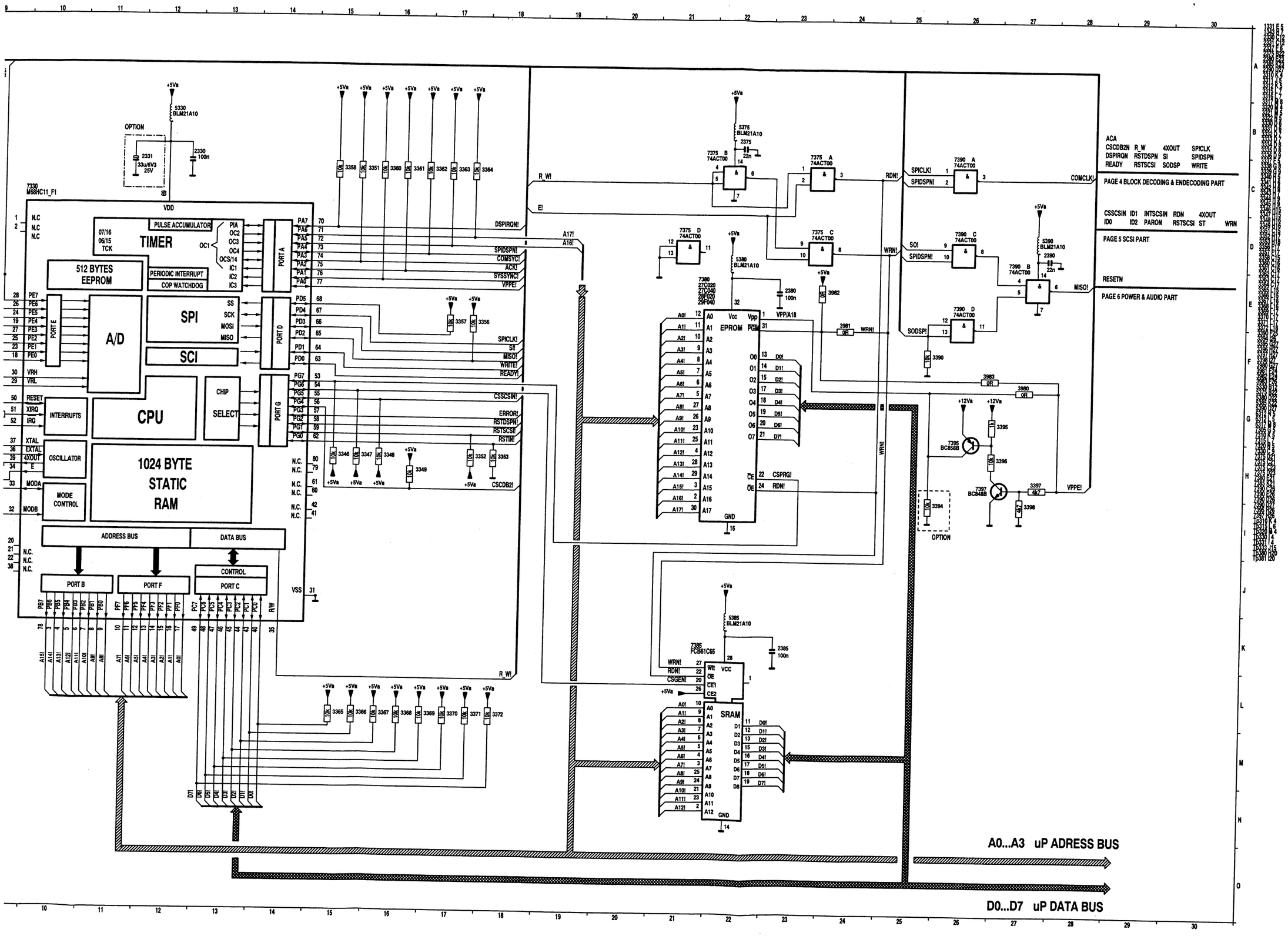
R_W!
E!
A17!
A16!

7375 B 74ACT00
7375 A 74ACT00
7375 D 74ACT00
7375 C 74ACT00
5375 BLM21A10
2375 22n
5380 BLM21A10
2380 100n
3982 0R
3981 0R

7380 27C020 27C040 29F020 29F040
EPROM
VPP/A18
CSPRG!
RDN!

5385 BLM21A10
2385 100n
7385 FCB61C65
SRAM
WRN!
RDN!
CSGEN!

READY! 7310 BC858B
WRITE! 7315 BC858B
ERROR! 7320 BC858B
6312_B TLMV3100
6317 TLMH3100
6312_A TLMV3100


7330
M68HC11_F1
OPTION
5330
BLM21A10
2331
33u/6V3
25V
2330
100n
VDD
TIMER
PULSE ACCUMULATOR
07/16
06/15
TCK
OC1
PIA
OC2
OC3
OC4
OCS/14
IC1
IC2
IC3
512 BYTES
EEPROM
PERIODIC INTERRUPT
COP WATCHDOG
PORT A
PORT E
PORT D
PORT G
A/D
SPI
SS
SCK
MOSI
MISO
SCI
CHIP
SELECT
CPU
INTERRUPTS
OSCILLATOR
MODE
CONTROL
1024 BYTE
STATIC
RAM
ADDRESS BUS
DATA BUS
CONTROL
PORT B
PORT F
PORT C
N.C
VRH
VRL
RESET
XIRQ
IRQ
XTAL
EXTAL
4XOUT
E
MODA
MODB
VSS
R_W!
DSPIRON!
SPIDSPN!
COMSYC!
ACK!
SYSSYNC!
VPPE!
SPICLK!
SI!
MISO!
WRITE!
READY!
CSSCSIN!
ERROR!
RSTDSPN!
RSTSCSI!
RSTIN!
CSCDB2!
A17!
A16!
7375 B
74ACT00
7375 A
74ACT00
7375 D
74ACT00
7375 C
74ACT00
7390 A
74ACT00
7390 C
74ACT00
7390 B
74ACT00
7390 D
74ACT00
SPICLK!
SPIDSPN!
RDN!
WRN!
COMCLK!
SO!
SODSP!
MISO!
RESETN
5375
BLM21A10
5380
BLM21A10
5390
BLM21A10
2375
22n
2380
100n
2390
22n
3982
3981
0R
3983
0R
3980
0R
3390
7380
27C020
27C040
28F020
29F040
EPROM
VPP/A18
CSPRG!
RDN!
7395
BC858B
7397
BC848B
3395
3396
3397
4k7
3398
3394
VPPE!
OPTION
5385
BLM21A10
2385
100n
7385
FCB61C65
SRAM
CSGEN!
3357
3356
3358
3351
3360
3361
3362
3363
3364
3346
3347
3348
3349
3352
3353
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3367
3368
3369
3370
3371
3372
ACA
CSCDB2N R_W 4XOUT SPICLK
DSPIRON RSTDSPN SI SPIDSPN
READY RSTSCSI SODSP WRITE
PAGE 4 BLOCK DECODING & ENDECODING PART
CSSCSIN ID1 INTSCSIN RDN 4XOUT
ID0 ID2 PARON RSTSCSI ST WRN
PAGE 5 SCSI PART
RESETN
PAGE 6 POWER & AUDIO PART
A0...A3 uP ADRESS BUS
D0...D7 uP DATA BUS

# BLOCK DECODING & ENCODING

CLODS EFEN POWER_OFFSI

PAGE 1 SERVO PART

CFLG DAFU EFOUT SBDA
CLFU DAIN EFS V4
CL11 DAOUT MCLK WSENC
CLOUT EBU SBCL WSFU WSOUT

PAGE 2 ENCODING & DECODING PART

ACA READY
ATTB2 R_W 4XOUT SPICLK
CSCDB2N RSTDSPN SI SPIDSPN
DSPIRQN RSTSCSI SODSP WRITE

PAGE 3 USER CONTROL PART

D0...D7 UP DATABUS

A0...A3 UP ADDRESSBUS

## BLOCK DECODING & ENCODING

CLOUT DACDA WSOUT

PAGE 6 POWER & AUDIO OUTPUT PART

EBU! CL11! READY! WRITE! POWER_OFF! DACDA! I2SCL! WSR! DAFU! CLFU! WSFU!

7410 DSP56004

QVCC1 QGND1 QVCC2 QGND2 QVCC3 QGND3 DVCC DGND

PORT C SERIAL AUDIO INTERFACE

SD11 WSR SCKR SD10 WST SCKT SDO0 SDO1 SDO2

BOOT ROM | LOG2 ROM | SINE ROM | PROGRAM RAM | X MEM. RAM | Y MEM. RAM

PVCC PGND PCAP PINIT EXTAL DSCK/OS1 DS1/OS0 DSO DRN

PLL | ONCE | INTERNAL DATABUS SWITCH | PORT D GPI/O | PORT B SERIAL HOST INTERFACE | CONTROLLER | PROGRAM

SVCC1 SVCC2 SGND1 SGND2 SGND3 DGND2

GPIO0 GPIO3 GPIO1 GPIO2

PORT A DRAM/SRAM INTERFACE

MA0..MA17 MD0..MD7 MCSON MWRN MRDN

7430 7435 HM5L4400ATT DRAM

DMWRN! DMRDN! MRASN! MCASN!

7440 74HCT573

7445 CDB2 INF

UA0..UA3 URW UCS ACA ATT RSTA T1 T0 TEST NRQ ACK REQ HST SD SCK WS BSI

UD0..UD7 D0!..D7!

H0..H7 OMD00!..OMD07!

BCM HST SCR ROM EDC TIM

NC 21 NC 22 NC 30

ECC

RA0!..RA8! RD0..RD7 RDA0!..RDA7!

7450 FCB61C65 SRAM

CSSCIN IRQAN MA12 MWRN

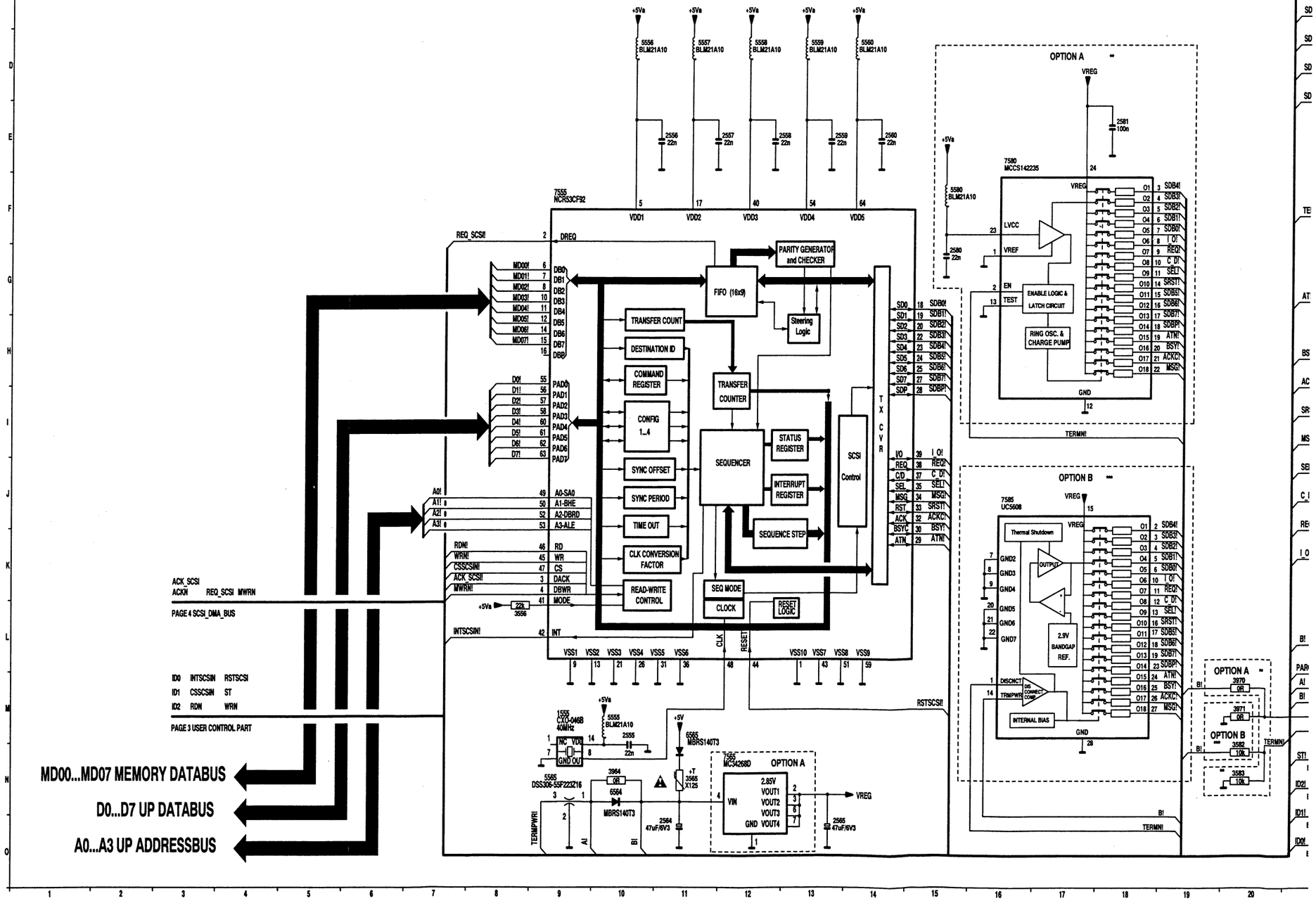
PAGE 4 SCSI_DMA_BUS

MD00..MD07 MEMORY DATA_BUS

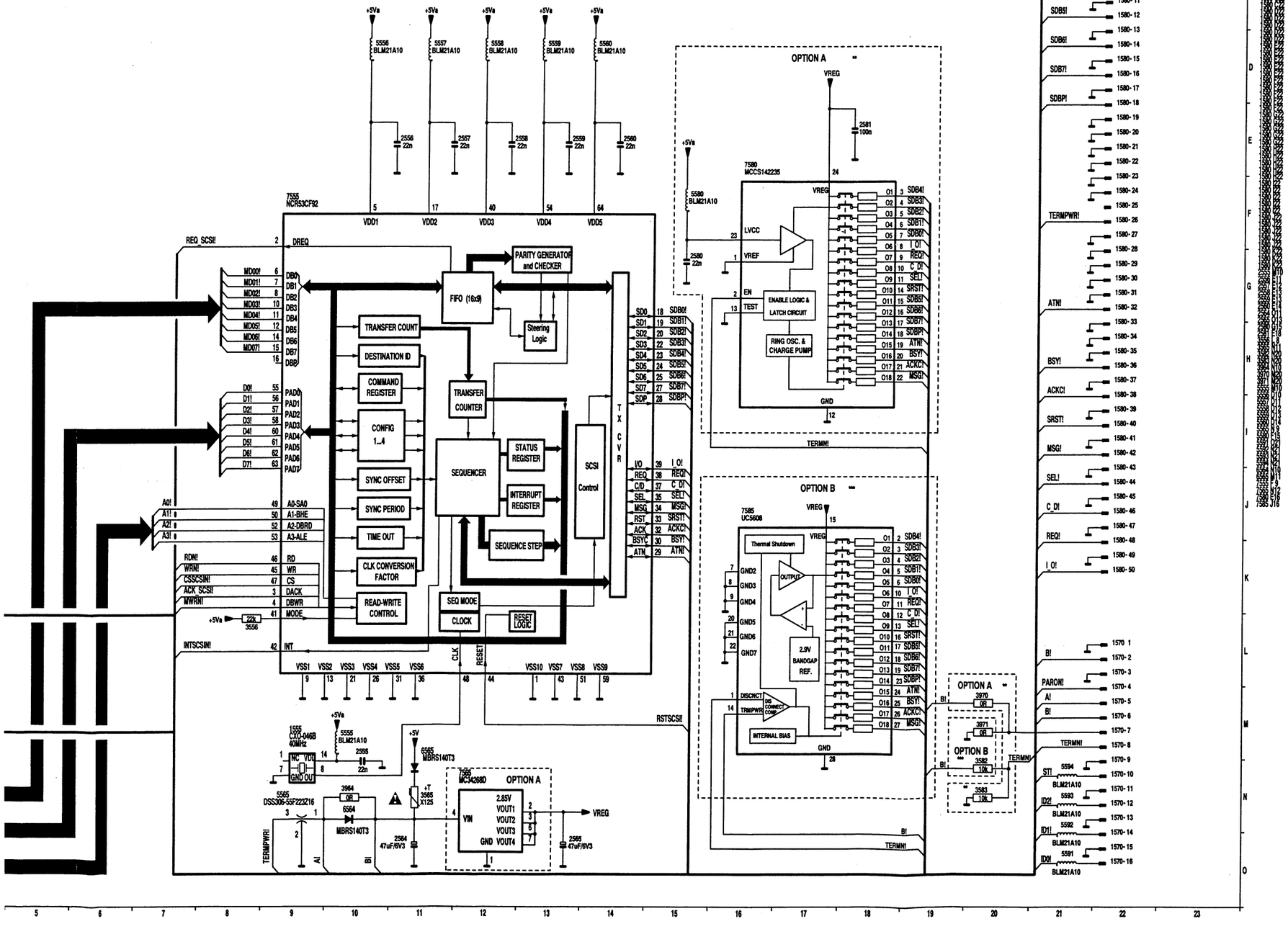
D0...D7 UP DATABUS

A0...A3 UP ADDRESSBUS

## SCSI PART


7555
NCR53CF92
VDD1
VDD2
VDD3
VDD4
VDD5
REQ_SCSI!
DREQ
MD00!
MD01!
MD02!
MD03!
MD04!
MD05!
MD06!
MD07!
DB0
DB1
DB2
DB3
DB4
DB5
DB6
DB7
DBP
D0!
D1!
D2!
D3!
D4!
D5!
D6!
D7!
PAD0
PAD1
PAD2
PAD3
PAD4
PAD5
PAD6
PAD7
A0!
A1!
A2!
A3!
A0-SA0
A1-BHE
A2-DBRD
A3-ALE
RD!
WR!
CSSCSIN!
ACK_SCSI!
MWR!
RD
WR
CS
DACK
DBWR
MODE
INT
INTSCSIN!
PARITY GENERATOR and CHECKER
FIFO (16x9)
Steering Logic
TRANSFER COUNT
DESTINATION ID
COMMAND REGISTER
CONFIG 1...4
SYNC OFFSET
SYNC PERIOD
TIME OUT
CLK CONVERSION FACTOR
READ-WRITE CONTROL
TRANSFER COUNTER
SEQUENCER
STATUS REGISTER
INTERRUPT REGISTER
SEQUENCE STEP
SEQ MODE
CLOCK
RESET LOGIC
SCSI Control
T X C V R
SD0
SD1
SD2
SD3
SD4
SD5
SD6
SD7
SDP
I/O
REQ
C/D
SEL
MSG
RST
ACK
BSY
ATN
SDB0!
SDB1!
SDB2!
SDB3!
SDB4!
SDB5!
SDB6!
SDB7!
SDBP!
I_O!
REQ!
C_D!
SEL!
MSG!
SRST!
ACK!
BSY!
ATN!
VSS1
VSS2
VSS3
VSS4
VSS5
VSS6
VSS10
VSS7
VSS8
VSS9
CLK
RESET
RSTSCSI!
ACK_SCSI
ACKN
REQ_SCSI
MWRN
PAGE 4 SCSI_DMA_BUS
ID0
ID1
ID2
INTSCSIN
CSSCSIN
RDN
RSTSCSI
ST
WRN
PAGE 3 USER CONTROL PART
MD00...MD07 MEMORY DATABUS
D0...D7 UP DATABUS
A0...A3 UP ADDRESSBUS
+5Va
5556 BLM21A10
5557 BLM21A10
5558 BLM21A10
5559 BLM21A10
5560 BLM21A10
2556 22n
2557 22n
2558 22n
2559 22n
2560 22n
OPTION A
VREG
2581 100n
7580 MCCS142235
5580 BLM21A10
2580 22n
LVCC
VREF
EN
TEST
ENABLE LOGIC & LATCH CIRCUIT
RING OSC. & CHARGE PUMP
GND
TERMN!
OPTION B
7585 UCS608
Thermal Shutdown
OUTPUT
2.9V BANDGAP REF.
DISCNCT
TRMPWR
INTERNAL BIAS
1555 CTX-046B 40MHz
5555 BLM21A10
2555 22n
6555 MBRS140T3
7565 MC34268D
2.85V
VIN
VOUT1
VOUT2
VOUT3
VOUT4
5565 DSS306-5SF223216
3964 0R
6564 MBRS140T3
TERMPWR!
2564 47uF/6V3
2565 47uF/6V3
3970 0R
3971 0R
3582 10K
3583 10K
TERMN!

## SCSI PART


+5Va
5556 BLM21A10
5557 BLM21A10
5558 BLM21A10
5559 BLM21A10
5560 BLM21A10
2556 22n
2557 22n
2558 22n
2559 22n
2560 22n
7555 NCR53CF92
VDD1
VDD2
VDD3
VDD4
VDD5
REQ_SCSI!
DREQ
MD00!
MD01!
MD02!
MD03!
MD04!
MD05!
MD06!
MD07!
DB0
DB1
DB2
DB3
DB4
DB5
DB6
DB7
DBP
PARITY GENERATOR and CHECKER
FIFO (16x9)
TRANSFER COUNT
DESTINATION ID
COMMAND REGISTER
CONFIG 1...4
SYNC OFFSET
SYNC PERIOD
TIME OUT
CLK CONVERSION FACTOR
READ-WRITE CONTROL
Steering Logic
TRANSFER COUNTER
SEQUENCER
STATUS REGISTER
INTERRUPT REGISTER
SEQUENCE STEP
SCSI Control
T X C V R
SEQ MODE
CLOCK
RESET LOGIC
D0!
D1!
D2!
D3!
D4!
D5!
D6!
D7!
PAD0
PAD1
PAD2
PAD3
PAD4
PAD5
PAD6
PAD7
A0!
A1!
A2!
A3!
A0-SA0
A1-BHE
A2-DBRD
A3-ALE
RD!
WR!
CSSCSIN!
ACK_SCSI!
MWR!
RD
WR
CS
DACK
DBWR
MODE
INTSCSIN!
INT
VSS1
VSS2
VSS3
VSS4
VSS5
VSS6
VSS10
VSS7
VSS8
VSS9
CLK
RESET
SD0
SD1
SD2
SD3
SD4
SD5
SD6
SD7
SDP
SDB0!
SDB1!
SDB2!
SDB3!
SDB4!
SDB5!
SDB6!
SDB7!
SDBP!
I/O
REQ
C/D
SEL
MSG
RST
ACK
BSY
ATN
I_O!
REQ!
C_D!
SEL!
MSG!
SRST!
ACK!
BSY!
ATN!
OPTION A
VREG
2581 100n
5580 BLM21A10
2580 22n
7580 MCCS142235
LVCC
VREF
EN
TEST
ENABLE LOGIC & LATCH CIRCUIT
RING OSC. & CHARGE PUMP
GND
TERMIN!
OPTION B
7585 UC5608
Thermal Shutdown
OUTPUT
2.9V BANDGAP REF.
GND2
GND3
GND4
GND5
GND6
GND7
DISCNCT
TRMPWR
DB CONNECT COMP
INTERNAL BIAS
O1
O2
O3
O4
O5
O6
O7
O8
O9
O10
O11
O12
O13
O14
O15
O16
O17
O18
RSTSCSI!
1555 CXO-046B 40MHz
5555 BLM21A10
2555 22n
6565 MBRS140T3
7565 MC34268D
2.85V
VOUT1
VOUT2
VOUT3
VOUT4
VIN
3964 0R
6564
5565 DSS306-55F223Z16
+T 3565 X125
MBRS140T3
2564 47uF/6V3
2565 47uF/6V3
TERMPWR!
3970 0R
3971 0R
3582 10K
3583 10K
TERMIN!
SDB0!
SDB1!
SDB2!
SDB3!
SDB4!
SDB5!
SDB6!
SDB7!
SDBP!
TERMPWR!
ATN!
BSY!
ACK!
SRST!
MSG!
SEL!
C_D!
REQ!
I_O!
5594 BLM21A10
5593 BLM21A10
5592 BLM21A10
5591 BLM21A10
ST!
ID2!
ID1!
ID0!
1580-1
1580-2
1580-3
1580-4
1580-5
1580-6
1580-7
1580-8
1580-9
1580-10
1580-11
1580-12
1580-13
1580-14
1580-15
1580-16
1580-17
1580-18
1580-19
1580-20
1580-21
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1580-46
1580-47
1580-48
1580-49
1580-50
1570-1
1570-2
1570-3
1570-4
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1570-6
1570-7
1570-8
1570-9
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1570-11
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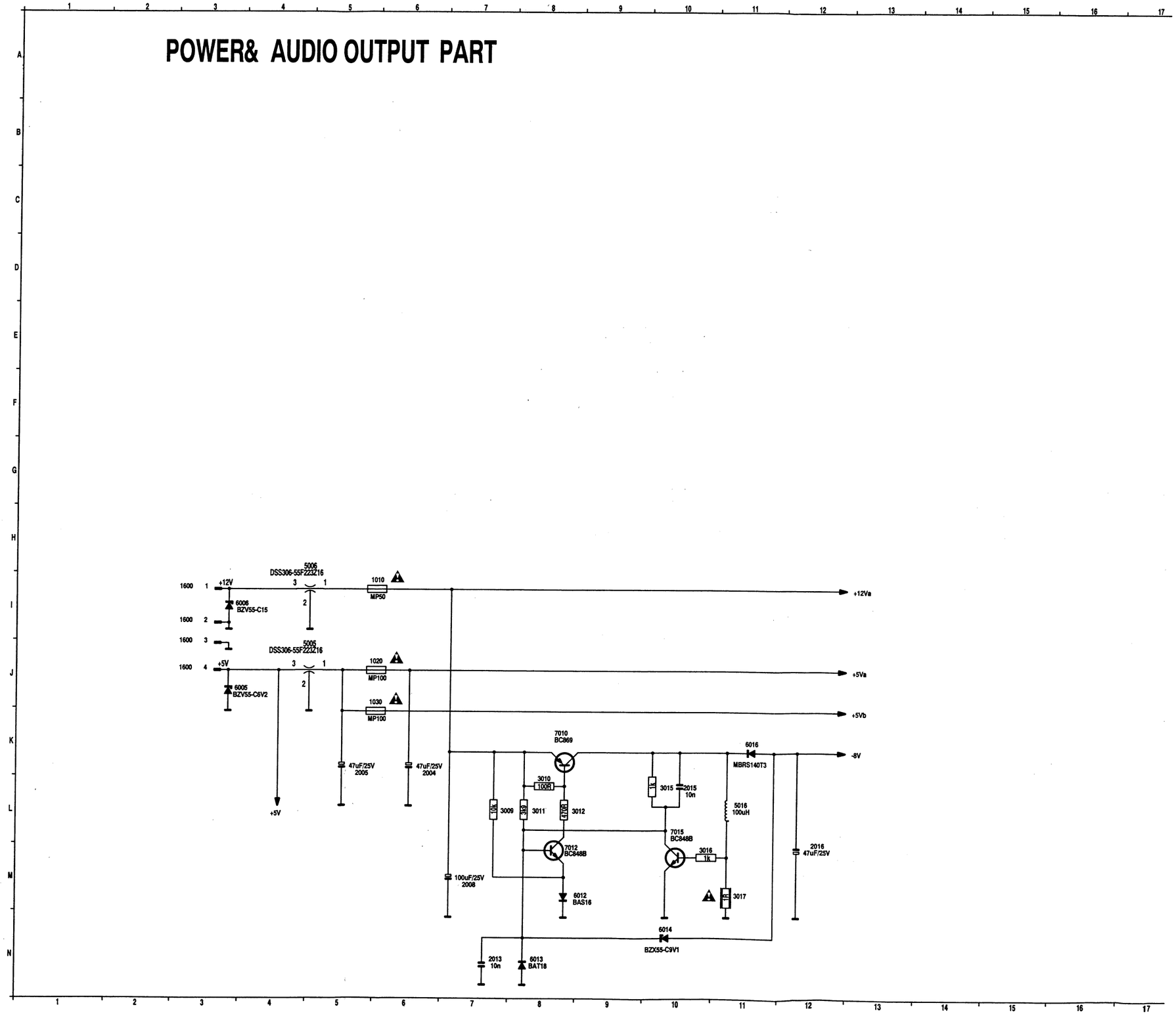
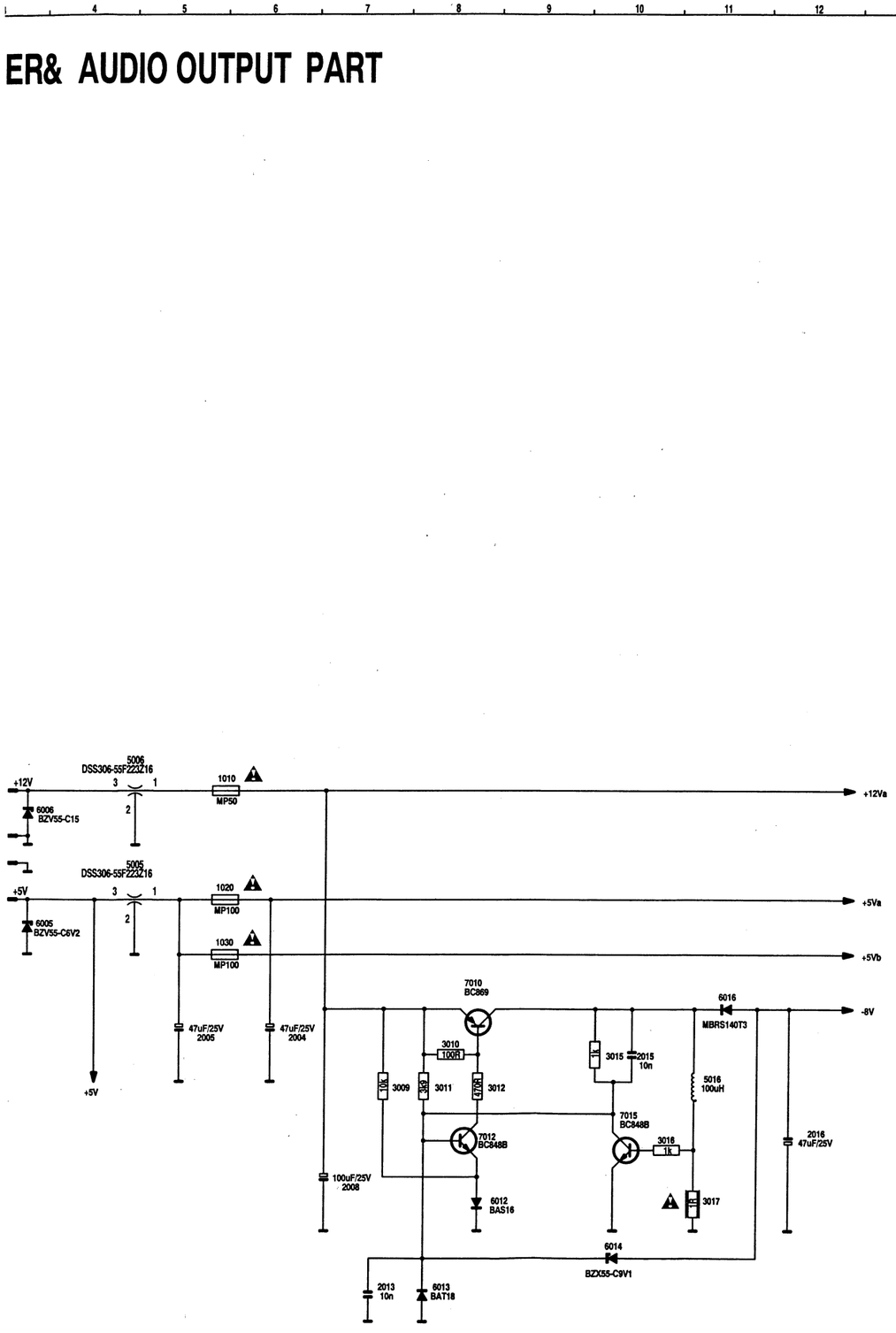
1570-13
1570-14
1570-15
1570-16

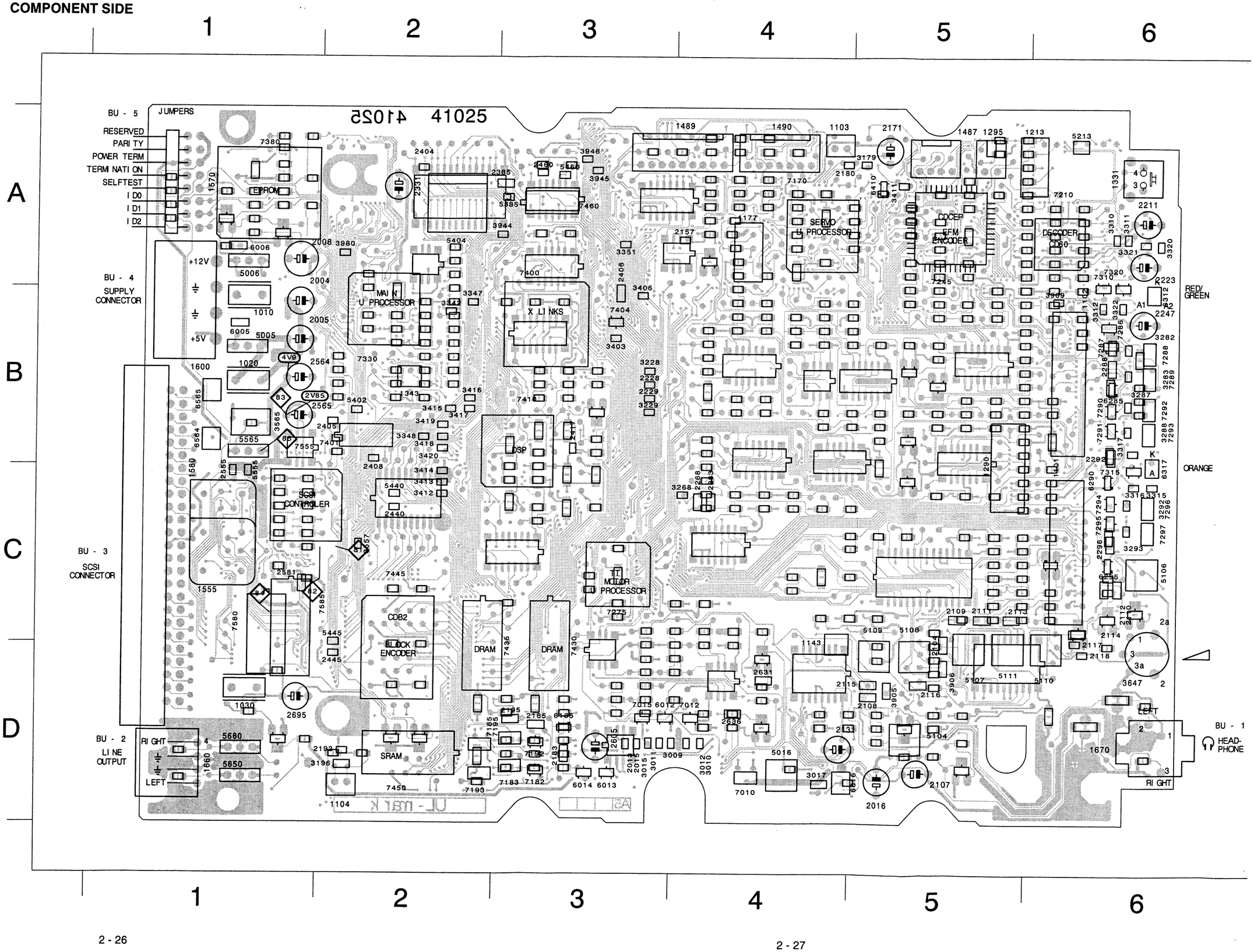
# POWER& AUDIO OUTPUT PART

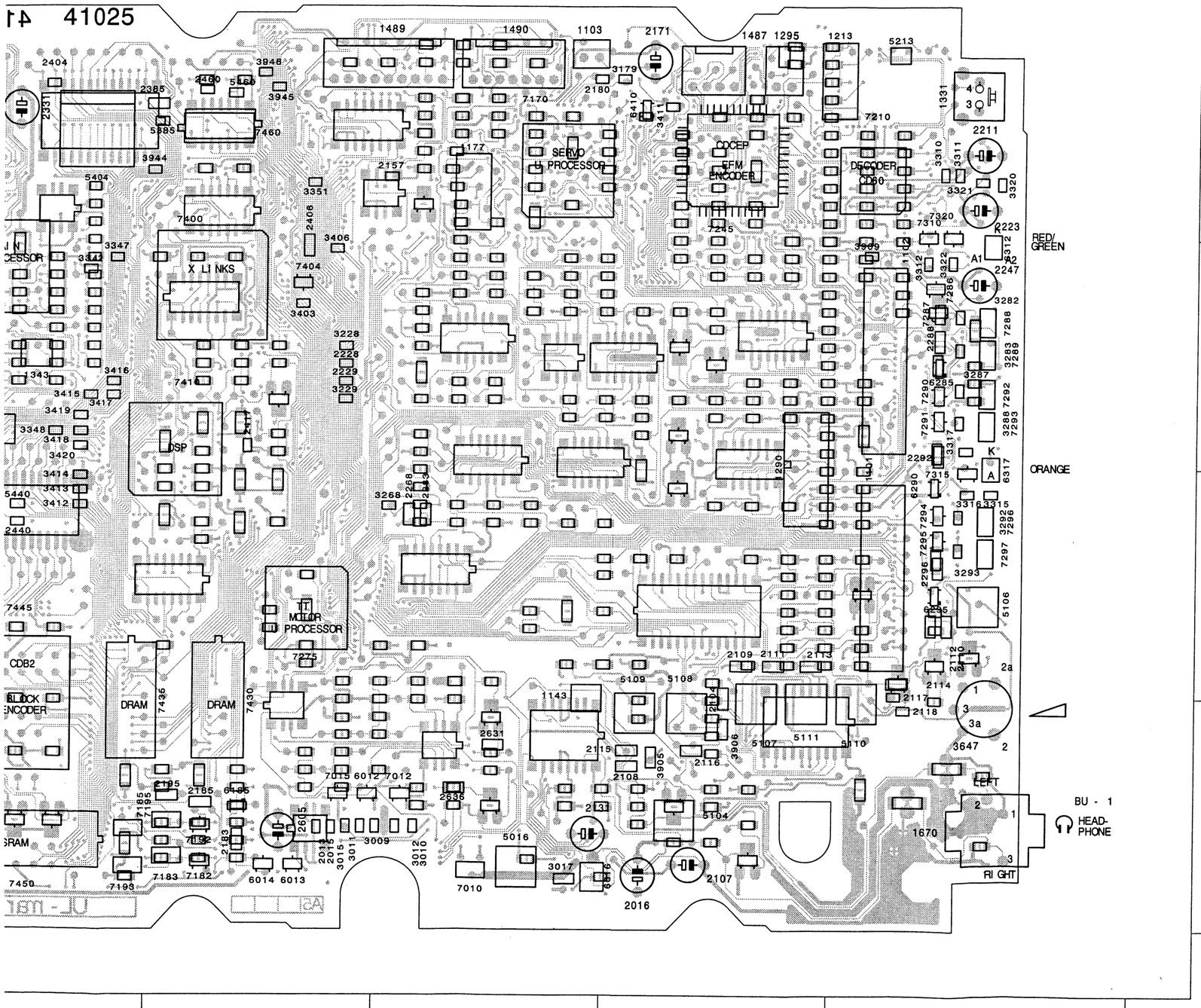


# ER& AUDIO OUTPUT PART



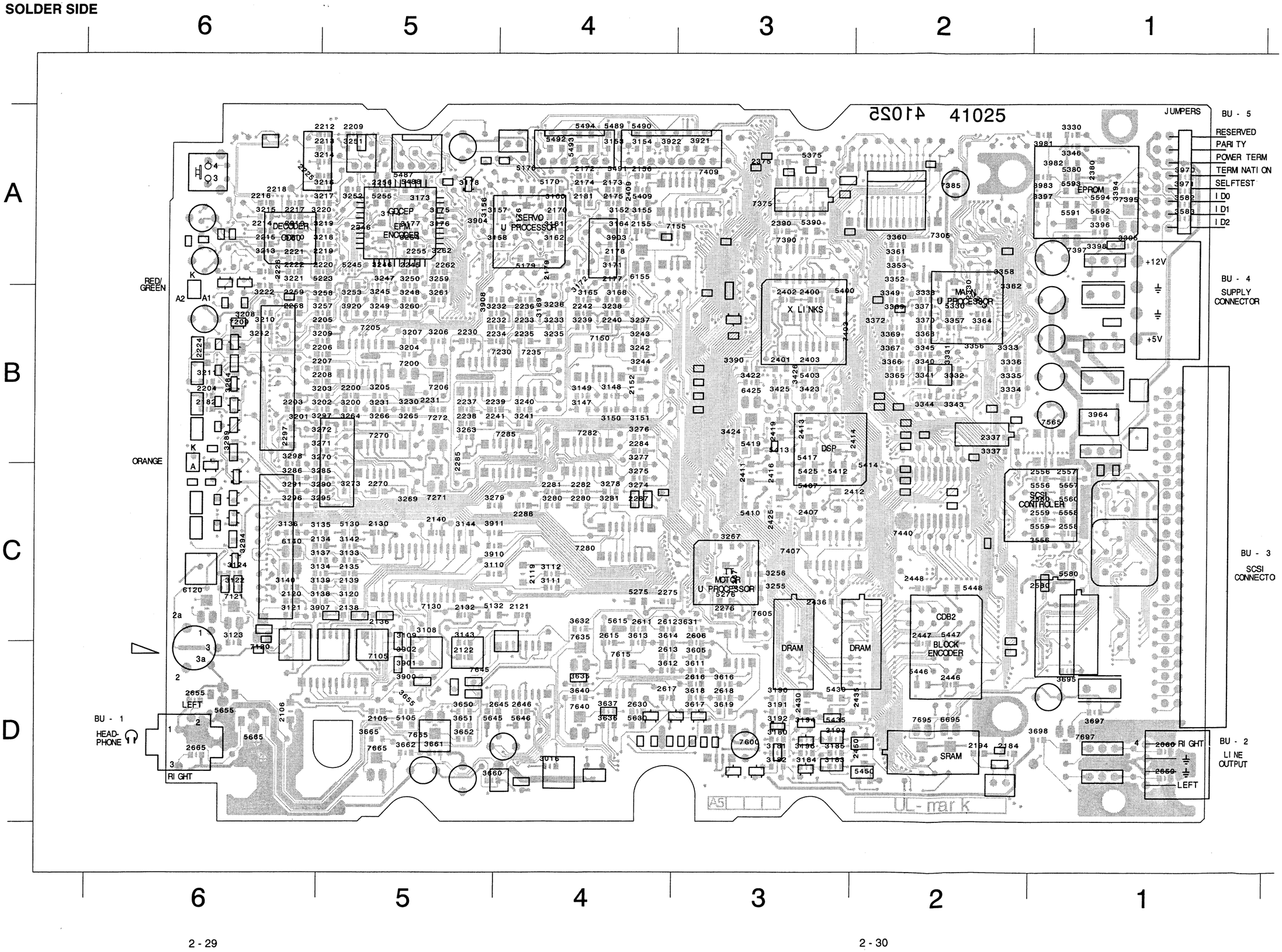
**COMPONENT SIDE**

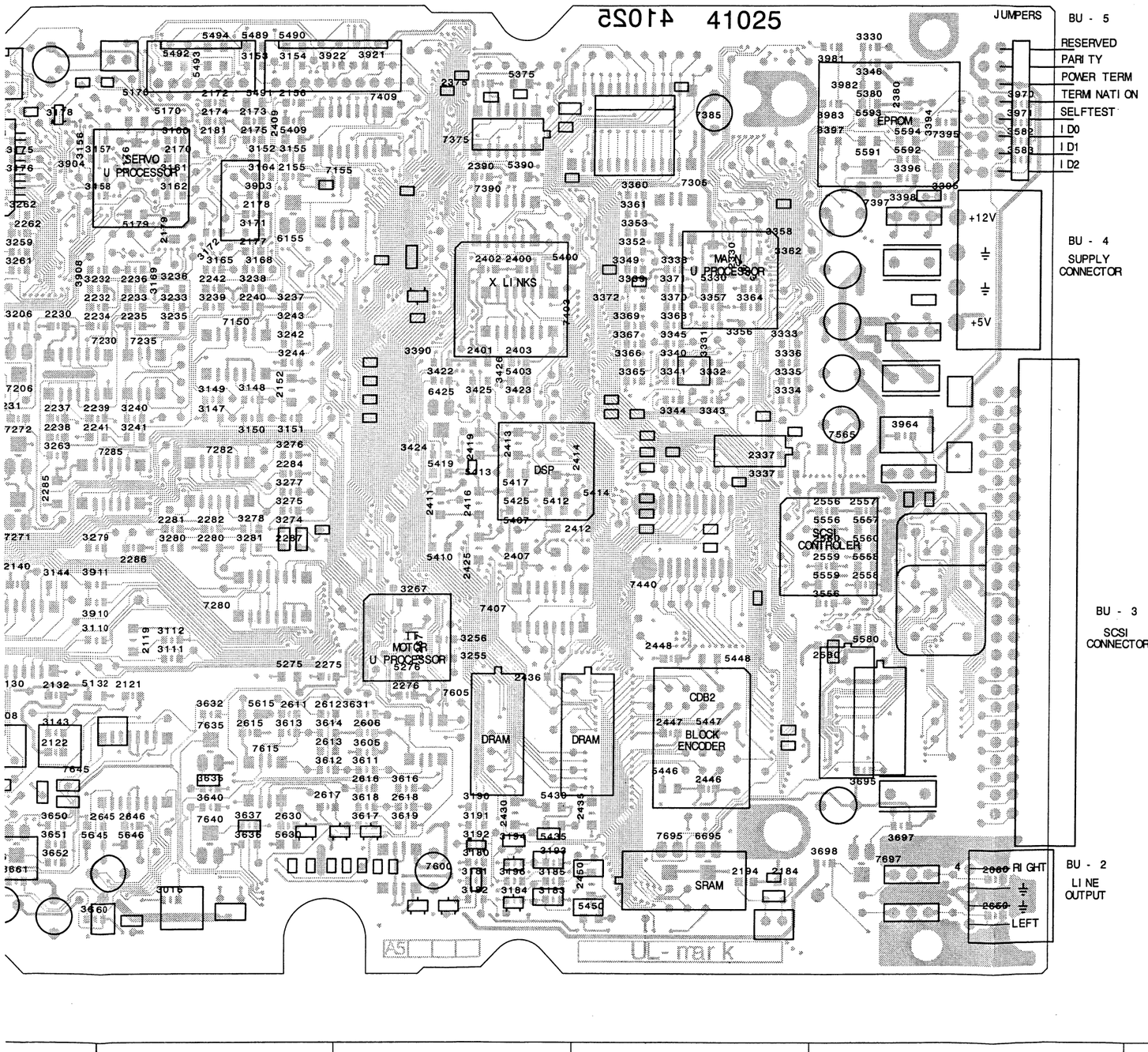

1
2
3
4
5
6
A
B
C
D
BU - 5
JUMPERS
RESERVED
PARITY
POWER TERM
TERMINATION
SELFTEST
ID0
ID1
ID2
BU - 4
SUPPLY
CONNECTOR
+12V
+5V
BU - 3
SCSI
CONNECTOR
BU - 2
LINE
OUTPUT
RIGHT
LEFT
BU - 1
HEAD-
PHONE
RIGHT
LEFT
EEPROM
MAIN
U PROCESSOR
X TALS
SCSI
CONTROLLER
DSP
CDB2
BLOCK
ENCODER
DRAM
DRAM
SRAM
MOTOR
PROCESSOR
SERVO
U PROCESSOR
CDCEP
EFM
ENCODER
DECODER
CD60
RED/
GREEN
ORANGE
41025
4V9
2V85
8P
8P
8P




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1010 | B 1 | 2440 | C 2 | 5106 | C 6 | 7435 | D 2 |
| 1020 | B 1 | 2445 | D 2 | 5107 | D 5 | 7445 | D 2 |
| 1030 | D 1 | 2460 | A 3 | 5108 | D 5 | 7450 | D 2 |
| 1101 | C 6 | 2555 | C 1 | 5109 | D 5 | 7460 | A 3 |
| 1102 | B 6 | 2564 | B 1 | 5110 | D 6 | 7555 | C 1 |
| 1103 | A 4 | 2565 | B 1 | 5111 | D 5 | 7580 | C 1 |
| 1104 | D 2 | 2581 | C 1 | 5213 | A 6 | 7585 | C 1 |
| 1143 | D 4 | 2605 | D 3 | 5385 | A 3 | | |
| 1177 | A 4 | 2631 | D 4 | 5402 | B 2 | | |
| 1213 | A 6 | 2636 | D 4 | 5404 | A 2 | | |
| 1290 | C 5 | 2695 | D 1 | 5440 | C 2 | | |
| 1295 | A 5 | 3009 | D 4 | 5445 | C 2 | | |
| 1331 | A 6 | 3010 | D 4 | 5460 | A 3 | | |
| 1343 | B 2 | 3011 | D 3 | 5555 | C 1 | | |
| 1487 | A 5 | 3012 | D 4 | 5565 | B 1 | | |
| 1489 | A 4 | 3015 | D 3 | 5650 | D 1 | | |
| 1490 | A 4 | 3017 | D 4 | 5660 | D 1 | | |
| 1555 | C 1 | 3179 | A 5 | 6005 | B 1 | | |
| 1570 | A 1 | 3196 | D 2 | 6006 | A 1 | | |
| 1580 | C 1 | 3228 | B 3 | 6012 | D 3 | | |
| 1600 | B 1 | 3229 | B 3 | 6013 | D 3 | | |
| 1660 | D 1 | 3268 | C 4 | 6014 | D 3 | | |
| 1670 | D 6 | 3282 | B 6 | 6016 | D 4 | | |
| 2004 | B 1 | 3283 | B 6 | 6185 | D 3 | | |
| 2005 | B 1 | 3287 | B 6 | 6285 | B 6 | | |
| 2008 | A 1 | 3288 | B 6 | 6290 | C 6 | | |
| 2013 | D 3 | 3292 | C 6 | 6295 | C 6 | | |
| 2015 | D 3 | 3293 | C 6 | 6312 | B 6 | | |
| 2016 | D 5 | 3310 | A 6 | 6317 | C 6 | | |
| 2104 | D 5 | 3311 | A 6 | 6410 | A 5 | | |
| 2107 | D 5 | 3312 | B 6 | 6564 | B 1 | | |
| 2108 | D 5 | 3315 | C 6 | 6565 | B 1 | | |
| 2109 | C 5 | 3316 | C 6 | 7010 | D 4 | | |
| 2110 | C 6 | 3317 | B 6 | 7012 | D 4 | | |
| 2111 | C 5 | 3320 | A 6 | 7015 | D 3 | | |
| 2112 | C 6 | 3321 | A 6 | 7170 | A 4 | | |
| 2113 | C 5 | 3322 | B 6 | 7182 | D 3 | | |
| 2114 | C 6 | 3342 | B 2 | 7183 | D 3 | | |
| 2115 | D 5 | 3347 | B 2 | 7185 | D 2 | | |
| 2116 | D 5 | 3348 | B 2 | 7192 | D 3 | | |
| 2117 | C 6 | 3351 | A 3 | 7193 | D 2 | | |
| 2118 | D 6 | 3403 | B 3 | 7195 | D 3 | | |
| 2131 | D 4 | 3406 | B 3 | 7210 | A 6 | | |
| 2157 | A 4 | 3411 | A 5 | 7245 | A 5 | | |
| 2171 | A 5 | 3412 | C 2 | 7275 | C 3 | | |
| 2180 | A 4 | 3413 | C 2 | 7286 | B 6 | | |
| 2183 | D 3 | 3414 | C 2 | 7287 | B 6 | | |
| 2185 | D 3 | 3415 | B 2 | 7288 | B 6 | | |
| 2193 | D 2 | 3416 | B 2 | 7289 | B 6 | | |
| 2195 | D 3 | 3417 | B 2 | 7290 | B 6 | | |
| 2211 | A 6 | 3418 | B 2 | 7291 | B 6 | | |
| 2223 | A 6 | 3419 | B 2 | 7292 | B 6 | | |
| 2228 | B 3 | 3420 | B 2 | 7293 | B 6 | | |
| 2229 | B 3 | 3557 | C 2 | 7294 | C 6 | | |
| 2247 | B 6 | 3565 | B 1 | 7295 | C 6 | | |
| 2268 | C 4 | 3647 | D 6 | 7296 | C 6 | | |
| 2283 | C 4 | 3905 | D 5 | 7297 | C 6 | | |
| 2288 | B 6 | 3906 | D 5 | 7310 | A 6 | | |
| 2292 | B 6 | 3909 | B 6 | 7315 | C 6 | | |
| 2296 | C 6 | 3944 | A 3 | 7320 | A 6 | | |
| 2331 | A 2 | 3945 | A 3 | 7330 | B 2 | | |
| 2385 | A 3 | 3946 | A 3 | 7380 | A 1 | | |
| 2404 | A 2 | 3980 | A 2 | 7400 | B 3 | | |
| 2405 | B 2 | 5005 | B 1 | 7401 | B 2 | | |
| 2406 | B 3 | 5006 | A 1 | 7404 | B 3 | | |
| 2408 | B 2 | 5016 | D 4 | 7410 | B 3 | | |
| 2417 | B 3 | 5104 | D 5 | 7430 | D 3 | | |

**SOLDER SIDE**


41025
JUMPERS
BU - 5
RESERVED
PARITY
POWER TERM
TERMINATION
SELFTEST
ID0
ID1
ID2
+12V
+5V
BU - 4
SUPPLY
CONNECTOR
BU - 3
SCSI
CONNECTO
BU - 2
LINE
OUTPUT
RIGHT
LEFT
BU - 1
HEAD-
PHONE
RIGHT
LEFT
RED/
GREEN
ORANGE
DECODER
ENCODER
SERVO
U PROCESSOR
MOTOR
U PROCESSOR
MAIN
U PROCESSOR
X LINKS
EPROM
DSP
SCSI
CONTROLER
CDB2
BLOCK
ENCODER
DRAM
DRAM
SRAM
UL-mark




| | | | | | | |
|---|---|---|---|---|---|---|
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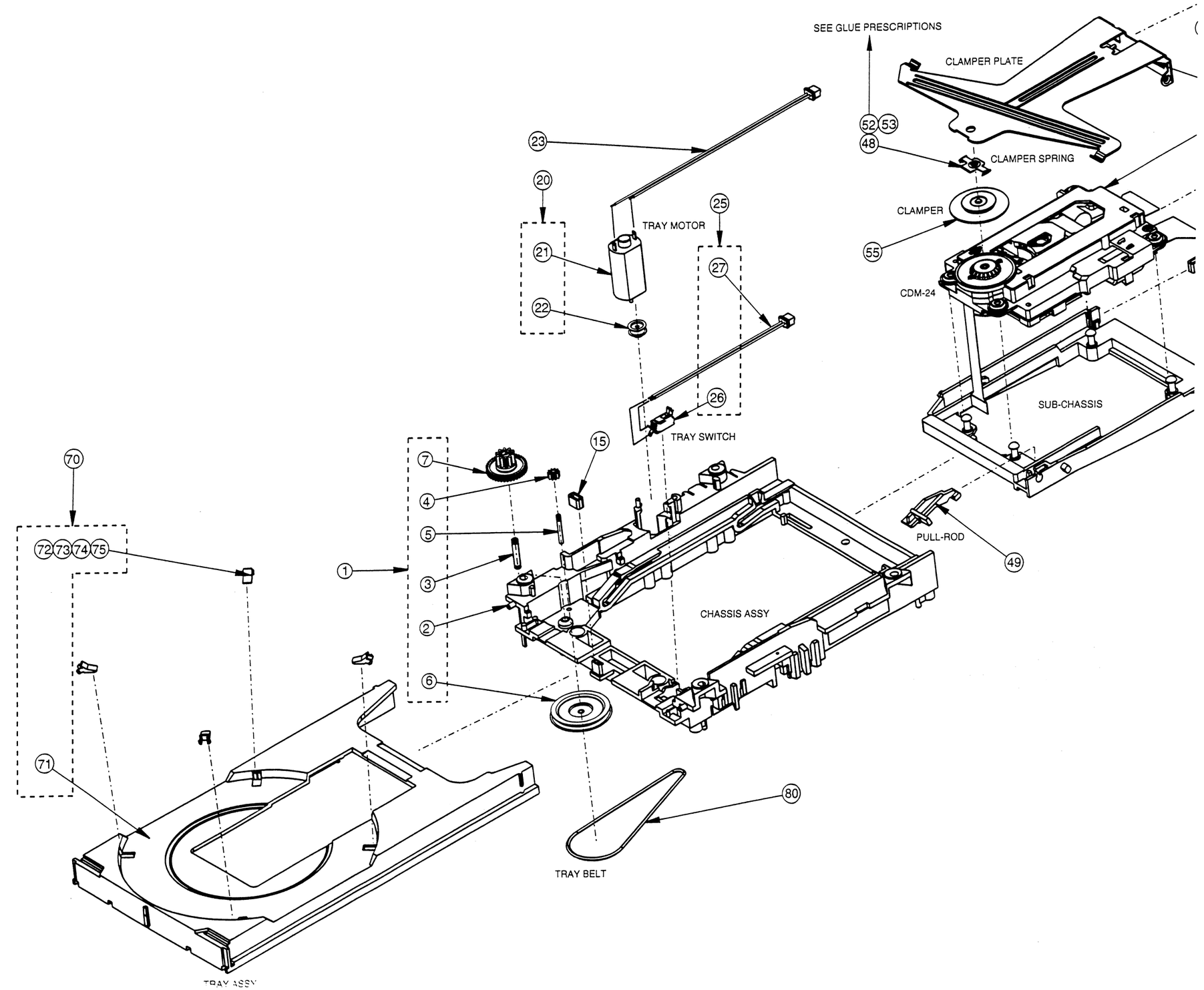
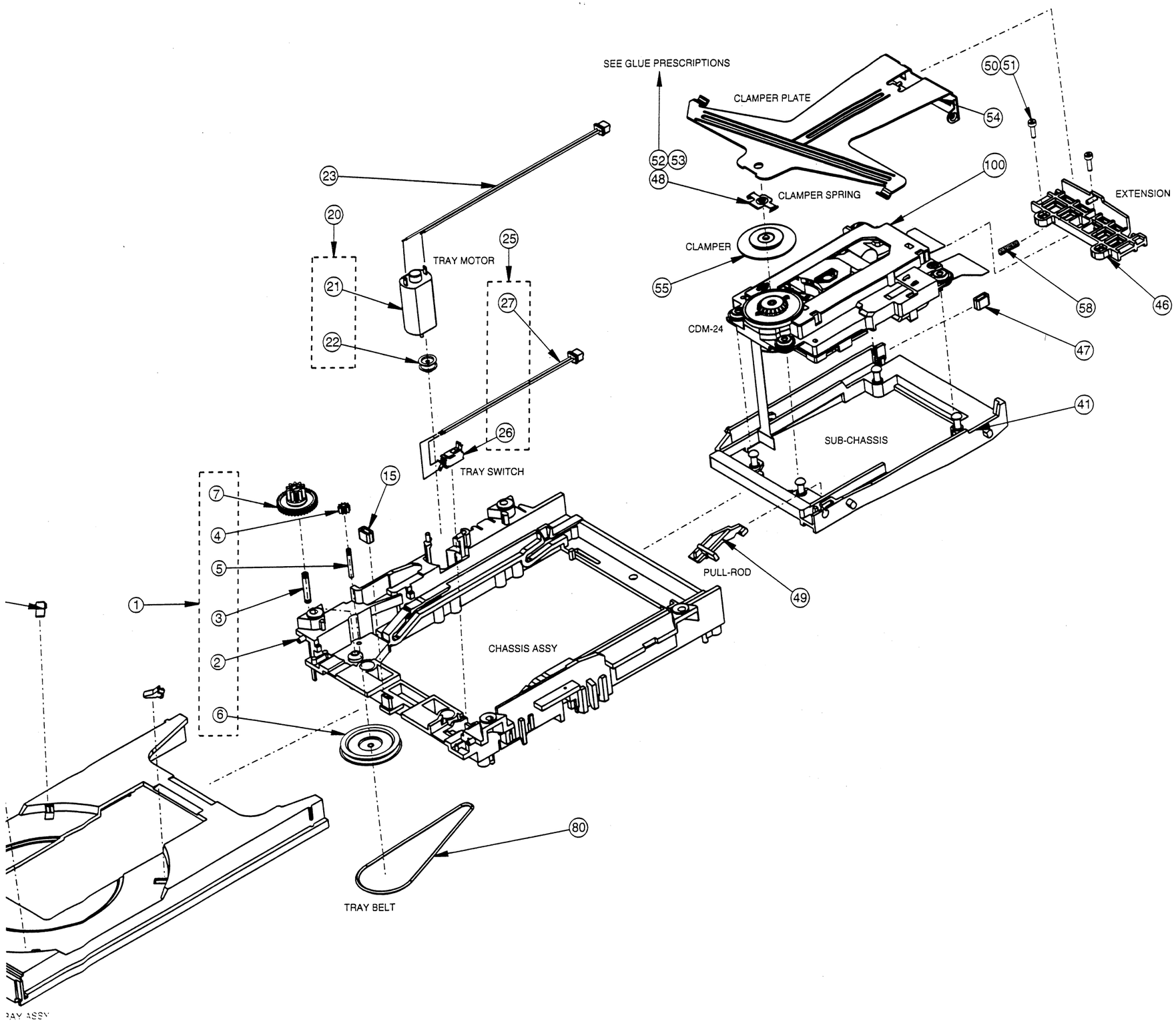
| 2106 D 6 | 2255 A 5 | 3111 C 4 | 3210 B 6 | 3290 C 5 | 3635 D 4 |
| 2119 C 4 | 2256 A 5 | 3112 C 4 | 3211 B 6 | 3291 C 6 | 3636 D 4 |
| 2120 C 6 | 2258 B 6 | 3120 C 5 | 3212 B 6 | 3294 C 6 | 3637 D 4 |
| 2121 C 4 | 2259 B 6 | 3121 C 6 | 3213 A 6 | 3295 C 5 | 3640 D 4 |
| 2122 D 5 | 2262 A 5 | 3122 C 6 | 3214 A 5 | 3296 C 6 | 3650 D 5 |
| 2130 C 5 | 2267 C 3 | 3123 D 6 | 3215 A 6 | 3297 B 5 | 3651 D 5 |
| 2132 C 5 | 2270 C 5 | 3124 C 6 | 3216 A 5 | 3298 C 6 | 3652 D 5 |
| 2134 C 5 | 2275 C 4 | 3133 C 5 | 3217 A 5 | 3330 A 1 | 3655 D 5 |
| 2135 C 5 | 2276 C 3 | 3134 C 5 | 3218 A 5 | 3331 B 2 | 3660 D 5 |
| 2136 C 5 | 2280 C 4 | 3135 C 5 | 3219 A 5 | 3332 B 2 | 3661 D 5 |
| 2138 C 5 | 2281 C 4 | 3136 C 6 | 3220 A 5 | 3333 B 2 | 3662 D 5 |
| 2139 C 5 | 2282 C 4 | 3137 C 5 | 3221 B 6 | 3334 B 2 | 3665 D 5 |
| 2140 C 5 | 2284 B 4 | 3138 C 5 | 3222 B 6 | 3335 B 2 | 3695 D 1 |
| 2152 B 4 | 2285 C 5 | 3139 C 5 | 3230 B 5 | 3336 B 2 | 3697 D 1 |
| 2155 A 4 | 2286 C 4 | 3140 C 6 | 3231 B 5 | 3337 B 2 | 3698 D 1 |
| 2156 A 4 | 2287 C 4 | 3142 C 5 | 3232 B 5 | 3338 B 2 | 3900 D 5 |
| 2170 A 4 | 2297 B 6 | 3143 D 5 | 3233 B 4 | 3339 B 2 | 3901 D 5 |
| 2172 A 4 | 2330 B 2 | 3144 C 5 | 3235 B 4 | 3340 B 2 | 3902 D 5 |
| 2173 A 4 | 2337 B 2 | 3147 B 4 | 3236 B 4 | 3341 B 2 | 3903 A 4 |
| 2174 A 4 | 2375 A 3 | 3148 B 4 | 3237 B 4 | 3343 B 2 | 3904 A 5 |
| 2175 A 4 | 2380 A 1 | 3149 B 4 | 3238 B 4 | 3344 B 2 | 3907 C 5 |
| 2176 A 4 | 2390 A 3 | 3150 B 4 | 3239 B 4 | 3345 B 2 | 3908 B 5 |
| 2177 B 4 | 2400 B 3 | 3151 B 4 | 3240 B 4 | 3346 A 1 | 3910 C 5 |
| 2178 A 4 | 2401 B 3 | 3152 A 4 | 3241 B 4 | 3349 B 2 | 3911 C 5 |
| 2179 A 4 | 2402 B 3 | 3153 A 4 | 3242 B 4 | 3352 B 2 | 3920 B 5 |
| 2181 A 4 | 2403 B 3 | 3154 A 4 | 3243 B 4 | 3353 A 2 | 3921 A 3 |
| 2182 B 6 | 2407 C 3 | 3155 A 4 | 3244 B 4 | 3356 B 2 | 3922 A 4 |
| 2184 D 2 | 2409 A 4 | 3156 A 5 | 3245 B 5 | 3357 B 2 | 3964 B 1 |
| 2194 D 2 | 2411 C 3 | 3157 A 5 | 3246 A 5 | 3358 A 2 | 3970 A 1 |
| 2200 B 5 | 2412 C 3 | 3158 A 5 | 3247 A 5 | 3360 A 2 | 3971 A 1 |
| 2203 B 6 | 2413 B 3 | 3160 A 4 | 3248 B 5 | 3361 A 2 | 3981 A 1 |
| 2204 B 6 | 2414 B 3 | 3161 A 4 | 3249 B 5 | 3362 B 2 | 3982 A 1 |
| 2205 B 5 | 2416 C 3 | 3162 A 4 | 3250 B 5 | 3363 B 2 | 3983 A 1 |
| 2206 B 5 | 2419 B 3 | 3164 A 4 | 3251 A 5 | 3364 B 2 | 5105 D 5 |
| 2207 B 5 | 2425 C 3 | 3165 B 4 | 3252 A 5 | 3365 B 2 | 5130 C 5 |
| 2208 B 5 | 2430 D 3 | 3168 B 4 | 3253 B 5 | 3366 B 2 | 5132 C 5 |
| 2209 A 5 | 2435 D 2 | 3169 B 4 | 3254 A 5 | 3367 B 2 | 5170 A 4 |
| 2210 A 6 | 2436 C 3 | 3171 A 4 | 3255 C 3 | 3368 B 2 | 5176 A 4 |
| 2212 A 5 | 2446 D 2 | 3172 A 4 | 3256 C 3 | 3369 B 2 | 5179 A 4 |
| 2213 A 5 | 2447 D 2 | 3173 A 5 | 3257 B 5 | 3370 B 2 | 5210 A 6 |
| 2214 A 6 | 2448 C 2 | 3174 A 5 | 3258 B 5 | 3371 B 2 | 5223 B 5 |
| 2215 A 6 | 2450 D 2 | 3175 A 5 | 3259 B 5 | 3372 B 2 | 5245 B 5 |
| 2216 A 6 | 2556 C 1 | 3176 A 5 | 3260 B 5 | 3390 B 3 | 5255 A 5 |
| 2217 A 6 | 2557 C 1 | 3177 A 5 | 3261 B 5 | 3394 A 1 | 5275 C 4 |
| 2218 A 6 | 2558 C 1 | 3178 A 5 | 3262 A 5 | 3395 A 1 | 5276 C 3 |
| 2219 A 5 | 2559 C 1 | 3180 D 3 | 3263 B 5 | 3396 A 1 | 5330 B 2 |
| 2220 A 5 | 2560 C 1 | 3181 D 3 | 3264 B 5 | 3397 A 1 | 5375 A 3 |
| 2221 A 6 | 2580 C 1 | 3182 D 3 | 3265 B 5 | 3398 A 1 | 5380 A 1 |
| 2222 A 6 | 2606 D 3 | 3183 D 3 | 3266 B 5 | 3422 B 3 | 5390 A 3 |
| 2224 B 6 | 2611 C 4 | 3184 D 3 | 3267 C 3 | 3423 B 3 | 5400 B 3 |
| 2225 A 5 | 2612 C 4 | 3185 D 3 | 3269 C 5 | 3424 B 3 | 5403 B 3 |
| 2226 A 6 | 2613 D 4 | 3190 D 3 | 3270 C 5 | 3425 B 3 | 5407 C 3 |
| 2230 B 5 | 2615 D 4 | 3191 D 3 | 3271 B 5 | 3426 B 3 | 5409 A 4 |
| 2231 B 5 | 2616 D 3 | 3192 D 3 | 3272 B 5 | 3556 C 1 | 5410 C 3 |
| 2232 B 5 | 2617 D 4 | 3193 D 3 | 3273 C 5 | 3582 A 1 | 5412 C 3 |
| 2233 B 4 | 2618 D 3 | 3194 D 3 | 3274 C 4 | 3583 A 1 | 5413 B 3 |
| 2234 B 5 | 2630 D 4 | 3195 D 3 | 3275 C 4 | 3605 D 3 | 5414 C 3 |
| 2235 B 4 | 2645 D 5 | 3200 B 5 | 3276 B 4 | 3611 D 3 | 5417 C 3 |
| 2236 B 4 | 2646 D 4 | 3201 B 6 | 3277 C 4 | 3612 D 4 | 5419 B 3 |
| 2237 B 5 | 2650 D 1 | 3202 B 5 | 3278 C 4 | 3613 D 4 | 5425 C 3 |
| 2238 B 5 | 2655 D 6 | 3203 B 5 | 3279 C 5 | 3614 D 4 | 5430 D 3 |
| 2239 B 5 | 2660 D 1 | 3204 B 5 | 3280 C 4 | 3616 D 3 | 5435 D 3 |
| 2240 B 4 | 2665 D 6 | 3205 B 5 | 3281 C 4 | 3617 D 3 | 5446 D 2 |
| 2241 B 5 | 3016 D 4 | 3206 B 5 | 3284 B 6 | 3618 D 3 | 5447 D 2 |
| 2242 B 4 | 3108 C 5 | 3207 B 5 | 3285 C 5 | 3619 D 3 | 5448 C 2 |
| 2245 A 5 | 3109 D 5 | 3208 B 6 | 3286 C 6 | 3631 C 3 | 5450 D 2 |

## 2.4 EXPLODED VIEWS AND PARTS LIST
## LOADER

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 1 | | 4822 464 51086 | CHASSIS ASSY |
| 15 | | 4822 325 60379 | DAMPING GROMMET |
| 20 | | 4822 361 21758 | TRAY MOTOR ASSY |
| 25 | | 4822 276 13608 | SWITCH ASSY |
| 26 | | 4822 277 10749 | SWITCH |
| 41 | | 4822 464 51084 | SUB-CHASSIS |
| 46 | | 4822 492 71688 | EXTENSION |
| 47 | | 4822 325 60379 | DAMPING GROMMET |
| 48 | | 4822 492 71686 | CLAMPER SPRING |
| 49 | | 4822 535 93546 | PULL-ROD |
| 54 | | 4822 466 83201 | CLAMPER PLATE |
| 55 | | 4822 532 52676 | CLAMPER |
| 58 | | 4822 492 52426 | COMPRESSION SPRING |
| 70 | | 4822 444 10173 | TRAY ASSY |
| 80 | | 4822 358 10149 | BELT |




SEE GLUE PRESCRIPTIONS
CLAMPER PLATE
50
51
54
52
53
48
CLAMPER SPRING
100
EXTENSION
23
20
25
TRAY MOTOR
CLAMPER
55
58
46
21
27
22
CDM-24
47
41
SUB-CHASSIS
26
TRAY SWITCH
15
7
4
5
PULL-ROD
49
1
3
2
CHASSIS ASSY
6
80
TRAY BELT

# DEMOUNTING LOADER L2465

Remove the following items starting with:

- ***Clamper assy spring*** pos. 58 with a pair of tweezers, keep the clamper in the downward position on the turntable.

- ***Clamper assy*** by lifting the clamper from the turntable motor and shifting the assy to the left out of the guides on the CDM24 sub chassis assy.

- ***Tray***
  Pull out the tray until it stucks. Press the two locks on both sides of the chassis assy outwards. Pull out the tray.

- ***Subchassis***
  Shift the sub chassis pos. 41 backwards until the two rear guiding cams are in a position corresponding with the two locks on the chassis.
  Bend the two locks on both sides of the chassis outwards and lift out the chassis.

- ***Tray motor assy***
  First remove the tray motor belt.
  Place the chassis on the table and bend the two locks-profiles on both sides of the tray motor compartment outwards seen from wiring side of the tray motor. Remove the tray motor.

- ***Switch assy***
  Hold down the locking cam below the switch and take out the switch by sliding it inwards.

# MOUNTING LOADER L2465

Rebuilding the loader starting from a new (empty) chassis.

- Replace the switch-assy and the tray motor assy.
- Replace the CDM into the 4 shafts on the sub-chassis of the loader.
- Push on the grommets otherwise they will come out.
- Apply a little grease on the 4 cams on both sides of the subchassis and the corresponding slides in the chassis.
- Replace the subchassis starting with the 2 cams in front of the subchassis into the two long holes on both sides of the chassis.
- Then shift the subchassis to the front side of the chassis until the two rear cams can fall into the holes on the chassis; then push the subchassis downwards.
- Replace the pull rod, item 49.

## Clamper assy

Before replacing the clamper assy a new clamper has to be mounted.
See also clamper adjustment.

- Replace the clamper by sliding the 2 holes into the cams on the subchassis of the CDM.
- Replace the clamper spring while the clamper is resting on the turntable.
- First insert the spring into the shaft on the subchassis and then by compressing the spring with the help of a pair of tweezers.
- Place the other end onto the shaft of the clamper assy.

## Tray assy

Before replacing the tray, the subchassis has to be placed and hold in the most forward position so the clamper is lifted from the turntable. Then gently insert the tray into its slides.

# MECHANICAL ADJUSTMENT

## Clamper spring alignment procedure

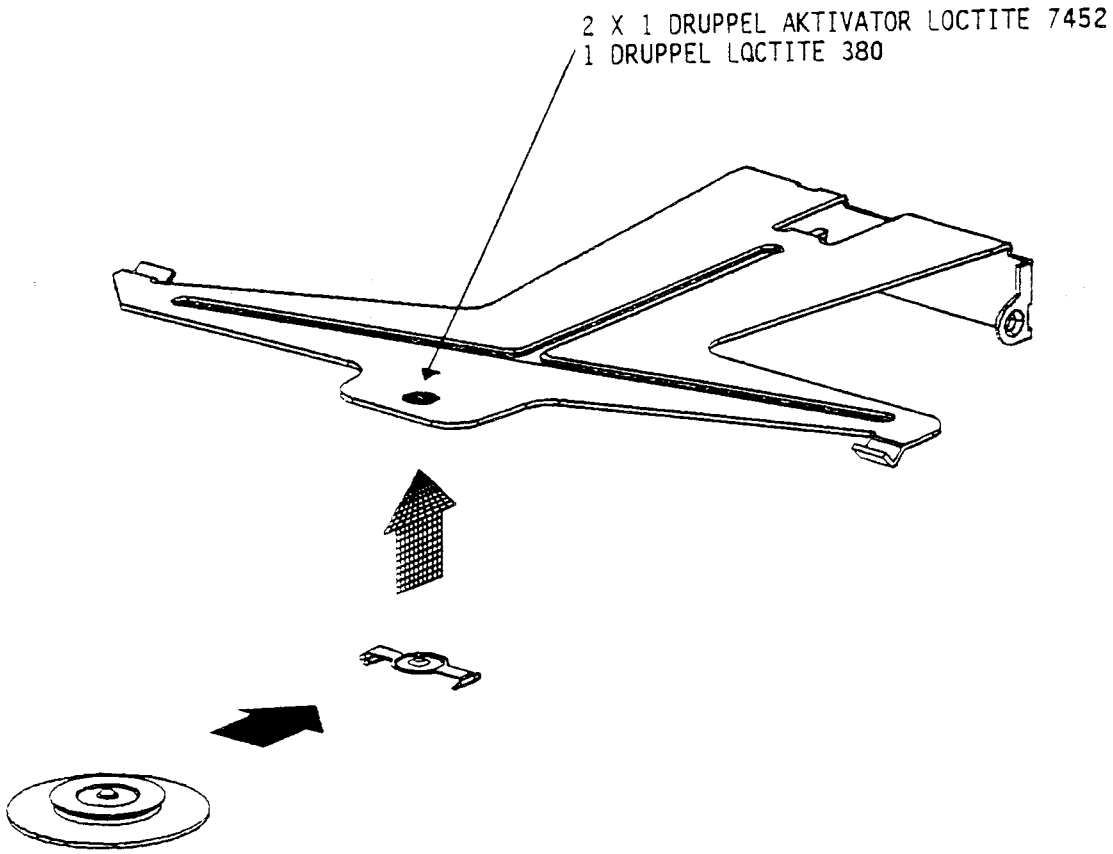
Always when the motor (including the CDM mounting plate) or the clamper spring itself has to be exchanged, then the clamper spring whereto the clamper is attached has to be re-aligned. This is necessary because of the high risk for unbalance of the disc at the high rotation speed (n=4).

Procedure:

The clamper is attached to a spring. This spring is glued with a special sealing paste (called: Black Max) to the clamper hold-down assy. The clamper assy and the spring has to be replaced always by a new set (including assy and spring).

Attaching the spring to the assy:

- Replace the new assy without the spring
- Place the special tool with the spring on the turntable and glue this together
- After hardening of the glue the tool can be removed and the clamper can be placed onto its place in the clamper spring



## CDM24

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 15 | | 4822 361 21759 | SLEDGE MOTOR |
| 16 | | 4822 492 71687 | SPRING CLIP |
| 17 | | 4822 402 61558 | SPRING CLIP |
| 4 | | 4822 492 71685 | SPRING CLIP |
| 5 | | 4822 492 71685 | SPRING CLIP |
| 10 | | 4822 522 33567 | GEAR |
| 13 | | 4822 522 33566 | GEAR RACK |
| 14 | | 4822 492 71684 | GEAR RACK SPRING |
| 15 | | 4822 466 62637 | SUSPENSION RUBBER |
| 16 | | 4822 466 62637 | SUSPENSION RUBBER |
| 17 | | 4822 466 62637 | SUSPENSION RUBBER |
| 18 | | 4822 466 62637 | SUSPENSION RUBBER |
| ⚠ 19 | | 4822 466 10691 | FLEX FOIL CDM24 CONN |
| ⚠ 20 | | 4822 466 10691 | FLEX FOIL CDM24 CONN |

**[ REMARK ]**

CDD2000 unit (CDR Module) and CDM-24 are not standard spare parts. The repairing of component level for those units is not allowed at local service agents also, except loader mechanical parts.
Rejected CDD2000 unit (CDR Module) should replace by Central Repair Procedure. Please contact to following MARANTZ regional office or your local MARANTZ national organization about the Central Repair Procedure.

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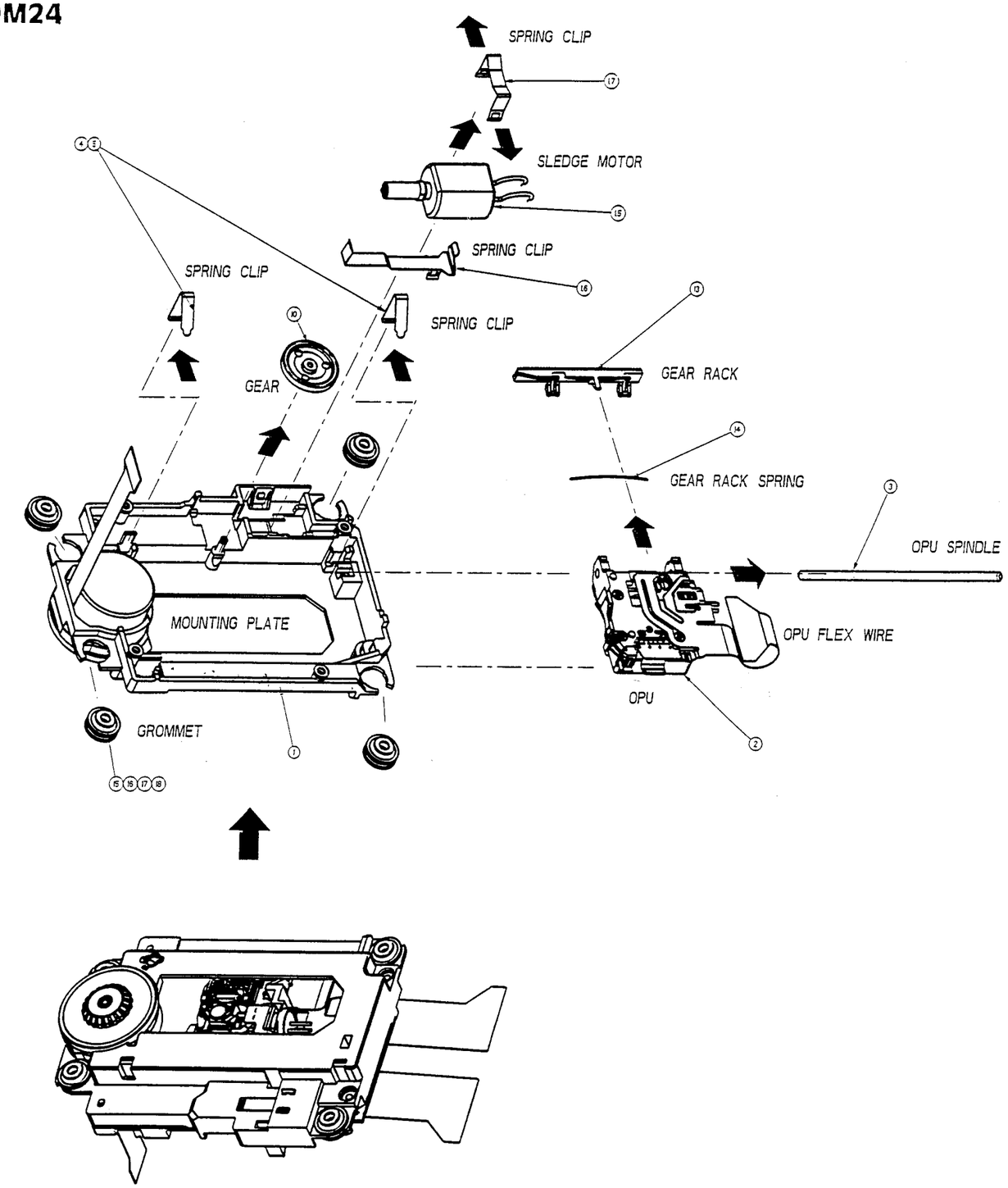
**[ CAUTION ]**

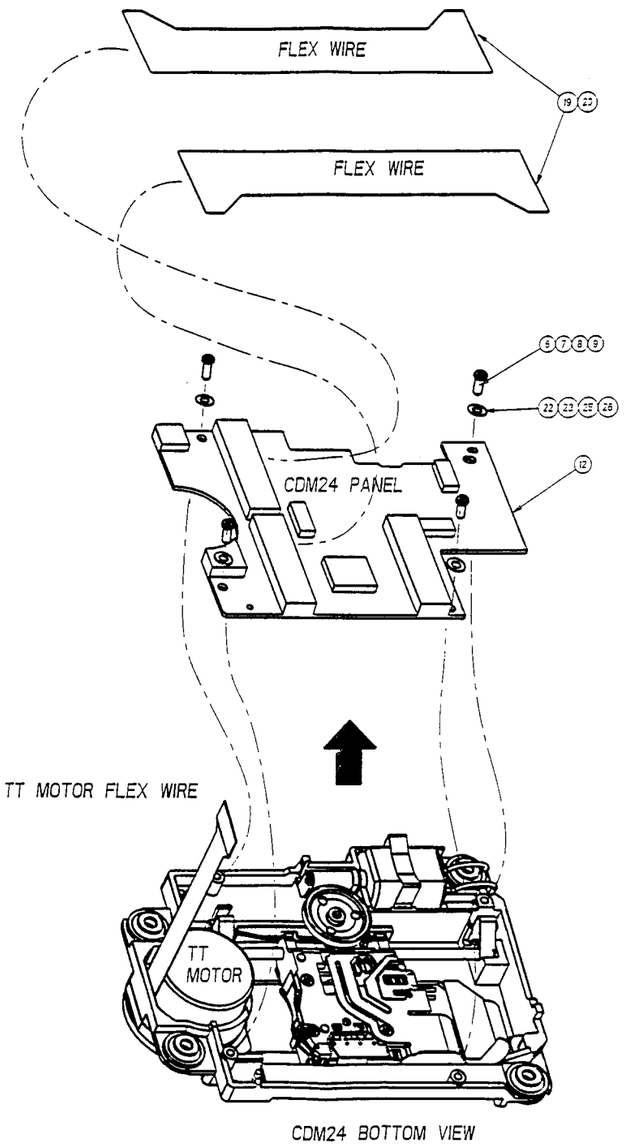
The CDM-24 for CDR620 and CDR615 is not same as a CDM-24 for PHILIPS CDD2000 (CDR-Drive equipment for computer system).
Dot not use the spare part CDM-24 (Service code number 4822 691 10471) mentioned on the PHILIPS CDD2000 service manual for MARANTZ CDR620 and CDR615 even if the factory code and looks similar.

## CDM24






CDM24




CDM24 BOTTOM VIEW

# CDM24

The CDM can be removed easily by lifting of the CDM from the 4 cams on the subchassis.

## Demounting CDM24

Remove the following items starting with:

**CDM24 Panel (PCB)**
- Desolder the sledge motor wiring.
- Remove the 4 screws on the corners of the PCB.
- Open the flex connector and remove the flex wire coming from the OPU.

**Take ESD precautions by placing a clip or paperclip over the leads of the flex wire!**

**Sledge gear**
- Turn the CDM on its back carefully. It is preferable to place the chassis on a raised area so that the turntable is free.
- Lift the gear with a pin of tweezers carefully from its shaft (replace always a new gear).
- Un-hook the spring clips from the OPU spindle from the top side.
- Turn over the CDM and remove the spring clips.
- Now the spindle with the OPU can be taken out.
- Take out the OPU spindle from the mounting plate
- Remove the gear-rack and the spring.

**Sledge motor**
- Un-hook the motor spring clip, this can be reached from the top-side of the mounting plate.
- Remove the clip spring which is covering the motor.
- Now the motor with the spring blade below the motor can be removed.



## Mounting CDM24

Building up the CDM starting from the mounting plate with the turntable motor included (service part).

**Sledge motor**
- Replace sledge motor with its black-spring and the motor holding blade-spring.
- Apply also a small amount of grease to the end of the gear spindle.

**OPU**
- Replace the spindle and the gear-rack with its spring.
- Now the complete OPU can be replaced on the mounting plate.
- First enter the opposite side of the spindle in the mounting plate and then the whole spindle in the mounting plate.
- Replace the spindle spring clips.
- First place one end of the spring clips near the spindle and then push the other end through the holes in the mounting plate until it clicks to its place.

**Gear**
- Before placing the gear on its shaft bend over the gear-rack inside so the gear rack is not in touch with the gear spindle.
- After this, replace the gear while keeping the rack into its previous described position.

**CDM24 panel**
- Replace the panel, mount the 4 screws and the flexwire. Resolder the sledge motor wiring to the panel.

**CDM sub-chassis**
- Replace the subchassis with two screws to the rear side of the mounting plate.

**Grommets**
- Replace the 4 damping grommets into its corresponding holes on the mounting plate.

**【 REMARK 】**

CDD2000 unit (CDR Module) and CDM-24 are not standard spare parts. The repairing of component level for those units is not allowed at local service agents also, except loader mechanical parts.
Rejected CDD2000 unit (CDR Module) should replace by Central Repair Procedure. Please contact to following MARANTZ regional office or your local MARANTZ national organization about the Central Repair Procedure.

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**【 CAUTION 】**

The CDM-24 for CDR620 and CDR615 is not same as a CDM-24 for PHILIPS CDD2000 (CDR-Drive equipment for computer system).
Dot not use the spare part CDM-24 (Service code number 4822 691 10471) mentioned on the PHILIPS CDD2000 service manual for MARANTZ CDR620 and CDR615 even if the factory code and looks similar.

## 2.5 ELECTRICAL PARTS LIST

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| | | | **CDM PANEL** |
| | | | **MISCELLANEOUS** |
| 1001 | | 4822 267 60409 | CONN 22P |
| 1002 | | 4822 267 60409 | CONN 22P |
| 1003 | | 4822 267 60409 | CONN 22P |
| 1010 | | 4822 276 13607 | SWI DET 1P 0.1A/12V |
| | | | **CAPACITORS** |
| 2000 | | 4822 126 12782 | 100nF +80-20 Y5V 25V |
| 2001 | | 4822 122 33744 | 100pF 5% NP 50V |
| 2002 | | 5322 126 11579 | 3.3nF 10% X7R 63V |
| 2003 | | 5322 126 11579 | 3.3nF 10% X7R 63V |
| 2004 | | 5322 126 11583 | 10nF 10% X7R 63V |
| 2005 | | 4822 126 12782 | 100nF +80-20 Y5V 25V |
| 2006 | | 4822 126 11669 | 27PF |
| 2007 | | 4822 122 33752 | 15pF 5% NP 50V |
| 2008 | | 4822 122 33752 | 15pF 5% NP 50V |
| 2009 | | 4822 126 12779 | 10nF +80-20 Y5V 50V |
| 2010 | | 4822 126 12782 | 100nF +80-20 Y5V 25V |
| 2011 | | 4822 126 13616 | 390pF 10% X7R 50V |
| 2012 | | 4822 126 12782 | 100nF +80-20 Y5V 25V |
| 2013 | | 4822 126 12782 | 100nF +80-20 Y5V 25V |
| 2014 | | 4822 122 33744 | 100pF 5% NP 50V **(CDR620)** |
| 2014 | | 4822 126 13616 | 390pF 10% X7R 50V **(CDR615)** |
| 2015 | | | |
| \| | | 4822 126 12782 | 100nF +80-20 Y5V 25V |
| 2019 | | | |
| 2020 | | 4822 124 11463 | 10uF 20% 16V |
| 2021 | | | |
| \| | | 4822 126 12782 | 100nF +80-20 Y5V 25V |
| 2023 | | | |
| 2024 | | 4822 126 13192 | 2.2nF 10% X7R 63V |
| 2025 | | 4822 126 12782 | 100nF +80-20 Y5V 25V |
| 2026 | | 4822 126 12779 | 10nF +80-20 Y5V 50V |
| 2027 | | 4822 126 12778 | 1nF 10% X7R |
| 2028 | | 4822 126 12782 | 100nF +80-20 Y5V 25V |
| 2029 | | 4822 122 33777 | 47pF 5% NP 63V |
| 2030 | | 4822 126 12782 | 100nF +80-20 Y5V 25V |
| 2031 | | 4822 126 13617 | 1.8nF 10% X7R 50V **(CDR620)** |
| 2031 | | 5322 126 11579 | 3.3nF 10% X7R 50V **(CDR615)** |
| 2032 | | 4822 124 11445 | 47uF 20% 10V |
| 2033 | | 4822 126 12778 | 1nF 10% X7R |
| 2034 | | 4822 122 33752 | 15pF 5% NP 50V |
| 2035 | | | |
| \| | | 4822 126 12782 | 100nF +80-20 Y5V 25V |
| 2046 | | | |
| 2047 | | 4822 122 33753 | 150pF 5% NP 50V **(CDR620)** |
| 2047 | | 4822 122 33744 | 100pF 5% NP 50V **(CDR615)** |
| | | | **RESISTORS** |
| 3001 | | 4822 051 30183 | 18K 5% 0.062W |
| 3003 | | 4822 117 10837 | 100K 1% 0.1W |
| 3004 | | 4822 117 10837 | 100K 1% 0.1W |
| 3005 | | 4822 051 30185 | 1M8 5% 0.062W |
| 3006 | | 4822 117 10837 | 100K 1% 0.1W |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 3007 | | 4822 051 30224 | 220K 5% 0.062W |
| 3008 | | 4822 051 30683 | 68K 5% 0.062W |
| 3009 | | 4822 051 30153 | 15K 5% 0.062W |
| 3010 | | 4822 051 30473 | 47K 5% 0.062W |
| 3011 | | 4822 051 30224 | 220K 5% 0.062W |
| 3012 | | 4822 051 30224 | 220K 5% 0.062W |
| 3013 | | 4822 051 30472 | 4K7 5% 0.062W |
| 3014 | | 4822 051 30122 | 1K2 5% 0.062W |
| 3016 | | 4822 051 30563 | 56K 5% 0.062W |
| 3017 | | 4822 051 30124 | 120K 5% 0.062W |
| 3018 | | 4822 051 30104 | 100K 5% 0.062W |
| 3019 | | 4822 051 30154 | 150K 5% 0.062W |
| 3020 | | 4822 051 30474 | 470K 5% 0.062W |
| 3021 | | 4822 051 30272 | 2K7 5% 0.062W |
| 3022 | | 4822 051 30104 | 100K 5% 0.062W |
| 3023 | | 4822 051 30152 | 1K5 5% 0.062W |
| 3024 | | 4822 051 30152 | 1K5 5% 0.062W |
| 3028 | | 4822 051 30391 | 390R 5% 0.062W |
| 3029 | | 4822 051 30681 | 680R 5% 0.062W |
| 3030 | | 4822 051 30104 | 100K 5% 0.062W |
| 3031 | | 4822 051 30104 | 100K 5% 0.062W |
| 3032 | | | |
| \| | | 4822 051 30224 | 220K 5% 0.062W |
| 3034 | | | |
| 3036 | | 4822 051 30224 | 220K 5% 0.062W |
| 3037 | | 4822 051 30103 | 10K 5% 0.062W |
| 3038 | | 4822 051 30153 | 15K 5% 0.062W |
| 3039 | | 4822 051 30103 | 10K 5% 0.062W |
| 3041 | | 4822 051 30473 | 47K 5% 0.062W **(CDR620)** |
| 3041 | | 4822 051 30333 | 33K 5% 0.062W **(CDR615)** |
| 3042 | | 4822 051 30103 | 10K 5% 0.062W |
| 3043 | | 4822 051 30223 | 22K 5% 0.062W |
| 3045 | | 4822 051 30222 | 2K2 5% 0.062W |
| 3046 | | 4822 051 30222 | 2K2 5% 0.062W |
| 3047 | | 4822 051 30332 | 3K3 5% 0.062W |
| 3049 | | | |
| \| | | 4822 051 30472 | 4K7 5% 0.062W |
| 3051 | | | |
| 3052 | | 4822 051 30152 | 1K5 5% 0.062W **(CDR615 ONLY)** |
| 3053 | | 4822 051 30472 | 4K7 5% 0.062W |
| 3055 | | 4822 051 30104 | 100K 5% 0.062W **(CDR620)** |
| 3055 | | 4822 051 30154 | 150K 5% 0.062W **(CDR615)** |
| 3056 | | 4822 051 30104 | 100K 5% 0.062W |
| 3057 | | 4822 051 30104 | 100K 5% 0.062W |
| 3058 | | 4822 051 30683 | 68K 5% 0.062W |
| 3059 | | 4822 051 30184 | 180K 5% 0.062W |
| 3060 | | 4822 051 30392 | 3K9 5% 0.062W **(CDR620 ONLY)** |
| 3061 | | 4822 051 30152 | 1K5 5% 0.062W |
| 3062 | | 4822 117 11746 | 43K RC12H1% 0.1W |
| 3063 | | 4822 117 11448 | 180R 1% 0.1W |
| 3064 | | 4822 051 30472 | 4K7 5% 0.062W |
| 3067 | | 4822 051 30123 | 12K 5% 0.062W |
| 3068 | | 4822 051 30472 | 4K7 5% 0.062W |
| 3070 | | 4822 051 30152 | 1K5 5% 0.062W |
| 3071 | | 4822 051 30103 | 10K 5% 0.062W |

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 3072 | | 4822 051 30103 | 10K 5% 0.062W |
| 3073 | | 4822 051 30152 | 1K5 5% 0.062W |
| 3074 | | | |
| I | | 4822 051 30103 | 10K 5% 0.062W |
| 3076 | | | |
| 3077 | | 4822 051 30152 | 1K5 5% 0.062W |
| 3078 | | 4822 051 30103 | 10K 5% 0.062W |
| ⚠ 3079 | | 4822 117 11747 | 12R 1206 5% FUSE |
| ⚠ 3080 | | 5322 117 11726 | 10R 5% |
| 3081 | | 4822 051 30151 | 150R 5% 0.062W |
| 3082 | | 4822 051 30152 | 1K5 5% 0.062W |
| 3084 | | 4822 051 30101 | 100R 5% 0.062W |
| 3085 | | 4822 051 30272 | 2K7 5% 0.062W |
| 3086 | | 4822 051 30103 | 10K 5% 0.062W **(CDR620 ONLY)** |
| 3087 | | 4822 051 30104 | 100K 5% 0.062W |
| 3088 | | 4822 051 30104 | 100K 5% 0.062W |
| 3089 | | 4822 051 30184 | 180K 5% 0.062W |
| 3090 | | 4822 051 30104 | 100K 5% 0.062W |
| 3091 | | 4822 051 30151 | 150R 5% 0.062W |
| 3092 | | 4822 051 30223 | 22K 5% 0.062W |
| 3093 | | 4822 051 30183 | 18K 5% 0.062W |
| 3094 | | 4822 051 30183 | 18K 5% 0.062W |
| 3095 | | 4822 051 30223 | 22K 5% 0.062W |
| 3096 | | 4822 051 30153 | 15K 5% 0.062W |
| 3097 | | 4822 051 30183 | 18K 5% 0.062W |
| 3098 | | 4822 051 30392 | 3K9 5% 0.062W |
| 3099 | | 4822 051 30229 | 22R 5% 0.062W |
| 3100 | | 4822 051 30271 | 270R 5% 0.062W |
| 3101 | | 4822 051 30103 | 10K 5% 0.062W |
| 3102 | | 4822 051 30563 | 56K 5% 0.062W |
| 3103 | | 4822 051 30333 | 33K 5% 0.062W |
| 3104 | | 4822 051 30271 | 270R 5% 0.062W |
| 3105 | | 4822 117 10352 | 33K 1% 0.2W |
| 3106 | | 4822 051 30222 | 2K2 5% 0.062W |
| 3107 | | 4822 051 30222 | 2K2 5% 0.062W |
| 3108 | | 4822 051 30223 | 22K 5% 0.062W |
| 3109 | | 4822 051 30229 | 22R 5% 0.062W |
| 3111 | | 4822 051 30391 | 390R 5% 0.062W **(CDR620 ONLY)** |
| 3112 | | 4822 051 30101 | 100R 5% 0.062W |
| 3113 | | | |
| I | | 4822 051 30103 | 10K 5% 0.062W |
| 3115 | | | |
| 3116 | | 4822 051 30472 | 4K7 5% 0.062W |
| 3118 | | 4822 051 30103 | 10K 5% 0.062W |
| 3119 | | 4822 051 30103 | 10K 5% 0.062W |
| 3120 | | 4822 051 30223 | 22K 5% 0.062W |
| 3121 | | 4822 051 30122 | 1K2 5% 0.062W **(CDR620)** |
| 3121 | | 4822 051 30391 | 390R 5% 0.062W **(CDR615)** |
| ⚠ 3124 | | 4822 051 10008 | 0R 5% 0.25W |
| 3125 | | 4822 051 30159 | 15R 5% 0.062W |
| ⚠ 3126 | | 4822 117 11747 | 12R 1206 5% FUSE |
| ⚠ 3127 | | 4822 117 11748 | 2R2 1206 5% FUSE |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 3128 | | 4822 051 30101 | 100R 5% 0.062W |
| 3129 | | 4822 051 30103 | 10K 5% 0.062W **(CDR620)** |
| 3129 | | 4822 051 30332 | 3K3 5% 0.062W **(CDR615)** |
| 3130 | | 4822 117 11503 | 220R 1% 0.1W |
| 3131 | | 4822 117 11503 | 220R 1% 0.1W |
| 3140 | | | |
| I | | 4822 051 30101 | 100R 5% 0.062W |
| 3143 | | | |
| | | | **SEMICONDUCTORS** |
| ⚠ 6000 | | 5322 130 31928 | BAS16 |
| 6001 | | 5322 130 80214 | BAS28 |
| 6003 | | 5322 130 80214 | BAS28 |
| 6004 | | 5322 130 80214 | BAS28 |
| 6007 | | 5322 130 80214 | BAS28 |
| ⚠ 6011 | | 5322 130 31928 | BAS16 |
| 6012 | | 5322 130 80913 | BAS31 |
| 6014 | | 5322 130 80214 | BAS28 |
| 6015 | | 5322 130 80214 | BAS28 **(CDR620 ONLY)** |
| 6016 | | 4822 130 91482 | GP2S27C |
| 7001 | | 5322 209 83125 | LM324D |
| 7002 | | 5322 209 83125 | LM324D |
| 7003 | | 4822 209 90331 | TL084CDT |
| 7004 | | 4822 209 90331 | TL084CDT |
| 7005 | | 4822 209 30426 | 74HC00D |
| 7006 | | 5322 209 71564 | 74HC08D |
| 7007 | | 4822 209 90334 | 74HC173D |
| 7010 | | 4822 209 33418 | TDA1372H/N1 |
| 7011 | | 5322 209 11519 | 74HC175D |
| 7012 | | 4822 209 90332 | MC79L05ABD |
| 7013 | | 4822 209 60792 | 74HC4053D |
| 7014 | | 5322 209 52659 | ST24C02AM6 |
| 7016 | | 4822 209 30351 | M62352GP |
| 7100 | | 4822 130 61207 | BC848 |
| 7101 | | 4822 130 60383 | BF824 |
| 7102 | | 5322 130 44787 | BFR31 |
| 7103 | | 4822 130 61207 | BC848 |
| 7104 | | 5322 130 60505 | BCV62 |
| 7106 | | 5322 130 60505 | BCV62 |
| 7108 | | | |
| I | | 5322 130 42718 | BFS20 |
| 7113 | | | |
| 7114 | | 5322 130 44787 | BFR31 |
| 7115 | | 4822 130 61207 | BC848 |
| 7116 | | 4822 130 62748 | BC858 |
| 7117 | | 4822 130 61207 | BC848 |
| 7118 | | | |
| I | | 4822 130 60383 | BF824 |
| 7120 | | | |
| 7121 | | 5322 130 41979 | BC808 |
| 7122 | | 5322 130 41979 | BC808 |
| 7123 | | 4822 130 62748 | BC858 |
| 7124 | | 4822 130 62748 | BC858 |
| 7127 | | 5322 130 60504 | BCV61 |

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| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 7128 | | 5322 130 60505 | BCV62 |
| 7129 | | 5322 130 44787 | BFR31 |
| 7130 | | 4822 130 62748 | BC858 |
| 7131 | | 4822 130 62748 | BC858 |
| 7132 | | 4822 130 60383 | BF824 |
| | | | **CDD2000 MAIN PCB (MAIN PANEL)** |
| | | | **MISCELLANEOUS** |
| ⚠ 1005 | | 4822 146 10348 | MAINS TRANSFORMER |
| 1010 | | 4822 252 51187 | 19398E1(0.500) |
| ⚠ 1020 | | 4822 252 51173 | 19398E1(1.000) |
| ⚠ 1030 | | 4822 252 51173 | 19398E1(1.000) |
| 1101 | | 4822 267 60409 | CONN 22P |
| 1102 | | 4822 267 60409 | CONN 22P |
| 1143 | | 4822 242 81546 | CSTCS8.46MT-TC |
| 1177 | | 4822 242 10238 | RESONATOR 25 MHz |
| 1213 | | 4822 242 10229 | CRYSTAL 33.8688 MHz |
| 1290 | | 4822 267 51454 | CONN 11P |
| 1331 | | 4822 276 13202 | SWITCH |
| 1343 | | 4822 242 82075 | CSTCS16.00MXC03-TC |
| 1555 | | 4822 242 81802 | CXO-049 |
| 1570 | | 4822 265 41515 | CONN 16P |
| 1580 | | 4822 265 61297 | CONN 50P |
| 1600 | | 4822 265 31274 | CONN 4P |
| 5005 | | 4822 242 82201 | DSS306-92F223Z16 |
| 5006 | | 4822 242 82201 | DSS306-92F223Z16 |
| 5016 | | 4822 157 71659 | 100UH 15% 7A06L |
| 5104 | | 4822 157 71659 | 100UH 15% 7A06L |
| 5105 | | 4822 157 71206 | BLM21A10PT |
| 5106 | | | |
| \| | | 4822 157 71658 | 27UH 15% 7A06L |
| 5109 | | | |
| 5110 | | 4822 157 71659 | 100UH 15% 7A06L |
| 5111 | | 4822 157 71659 | 100UH 15% 7A06L |
| 5130 | | 4822 157 71206 | BLM21A10PT |
| 5132 | | 4822 157 71206 | BLM21A10PT |
| 5170 | | 4822 157 71206 | BLM21A10PT |
| 5176 | | 4822 157 71206 | BLM21A10PT |
| 5179 | | 4822 157 71206 | BLM21A10PT |
| 5210 | | 4822 157 71206 | BLM21A10PT |
| 5213 | | 4822 157 70299 | 2U2 |
| 5223 | | 4822 157 71206 | BLM21A10PT |
| 5245 | | 4822 157 71206 | BLM21A10PT |
| 5255 | | 4822 157 71206 | BLM21A10PT |
| 5275 | | 4822 157 71206 | BLM21A10PT |
| 5276 | | 4822 157 71206 | BLM21A10PT |
| 5330 | | 4822 157 71206 | BLM21A10PT |
| 5375 | | 4822 157 71206 | BLM21A10PT |
| 5380 | | 4822 157 71206 | BLM21A10PT |
| 5385 | | 4822 157 71206 | BLM21A10PT |
| 5390 | | 4822 157 71206 | BLM21A10PT |
| 5400 | | 4822 157 71206 | BLM21A10PT |
| 5403 | | 4822 157 71206 | BLM21A10PT |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 5404 | | 4822 320 40315 | SAD-025-TR (25NS) |
| 5407 | | 4822 157 71206 | BLM21A10PT |
| 5409 | | 4822 157 71206 | BLM21A10PT |
| 5410 | | 4822 157 71206 | BLM21A10PT |
| 5412 | | | |
| \| | | 4822 157 71206 | BLM21A10PT |
| 5414 | | | |
| 5417 | | 4822 157 71206 | BLM21A10PT |
| 5419 | | 4822 157 71206 | BLM21A10PT |
| 5425 | | 4822 157 71206 | BLM21A10PT |
| 5430 | | 4822 157 71206 | BLM21A10PT |
| 5435 | | 4822 157 71206 | BLM21A10PT |
| 5440 | | 4822 157 71206 | BLM21A10PT |
| 5445 | | | |
| \| | | 4822 157 71206 | BLM21A10PT |
| 5448 | | | |
| 5450 | | 4822 157 71206 | BLM21A10PT |
| 5460 | | 4822 157 71206 | BLM21A10PT |
| 5487 | | | |
| \| | | 4822 157 71206 | BLM21A10PT |
| 5490 | | | |
| ⚠ 5492 | | | |
| \| | | 4822 051 20008 | 0R (0805) |
| ⚠ 5494 | | | |
| 5555 | | | |
| \| | | 4822 157 71206 | BLM21A10PT |
| 5560 | | | |
| 5565 | | 4822 242 82201 | DSS306-92F223Z16 |
| 5580 | | 4822 157 71206 | BLM21A10PT |
| 5591 | | | |
| \| | | 4822 157 71206 | BLM21A10PT |
| 5593 | | | |
| ⚠ 5594 | | 4822 051 20008 | 0R (0805) |
| | | | **CAPACITORS** |
| 2004 | | 4822 124 41527 | 47uF 25V |
| 2005 | | 4822 124 41527 | 47uF 25V |
| 2008 | | 4822 124 41528 | 100uF 25V |
| ⚠ 2013 | | 4822 122 33177 | 10nF 20% X7R 50V |
| ⚠ 2015 | | 4822 122 33177 | 10nF 20% X7R 50V |
| 2016 | | 4822 124 41527 | 47uF 25V |
| 2104 | | 5322 122 32838 | 82nF 10% X7R 63V |
| ⚠ 2105 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2106 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2107 | | 4822 124 80483 | 47uF 20% 6.3V |
| 2108 | | 5322 122 32838 | 82nF 10% X7R 63V |
| 2109 | | 4822 122 33325 | 470nF 16V |
| 2110 | | 4822 122 33325 | 470nF 16V |
| 2111 | | 5322 122 32838 | 82nF 10% X7R 63V |
| 2112 | | 5322 122 32838 | 82nF 10% X7R 63V |
| 2113 | | 4822 124 11353 | 1uF 20% 16V |
| 2114 | | 4822 124 11353 | 1uF 20% 16V |
| 2115 | | 4822 122 33325 | 470nF 16V |
| 2116 | | 4822 122 33325 | 470nF 16V |
| ⚠ 2117 | | 5322 122 32654 | 22nF 10% X7R 63V |

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| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| ▲ 2118 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2119 | | 5322 122 32838 | 82nF 10% X7R 63V |
| ▲ 2120 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2130 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2131 | | 4822 124 80483 | 47uF 20% 6.3V |
| ▲ 2132 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2134 | | | |
| \| | | 4822 122 33575 | 220pF 5% NPO 50V |
| 2136 | | | |
| 2138 | | 4822 122 33575 | 220pF 5% NPO 50V |
| 2139 | | 4822 126 10326 | 180pF 5% NP 63V |
| ▲ 2140 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2152 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ▲ 2155 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2156 | | 5322 126 10223 | 4.7nF 10% X7R 63V |
| ▲ 2157 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2170 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2171 | | 4822 124 41527 | 47uF 25V |
| 2172 | | | |
| \| | | 4822 122 33891 | 3.3nF 10% X7R 63V |
| 2174 | | | |
| ▲ 2175 | | 5322 122 34123 | 1nF 10% X7R 50V |
| 2176 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2177 | | 5322 122 32287 | 4.7pF 5% NP 50V |
| 2178 | | 5322 122 32287 | 4.7pF 5% NP 50V |
| 2179 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ▲ 2180 | | | |
| \| | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2182 | | | |
| 2183 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ▲ 2184 | | 4822 122 33177 | 10nF 20% X7R 50V |
| ▲ 2193 | | 4822 122 33177 | 10nF 20% X7R 50V |
| ▲ 2194 | | 4822 122 33177 | 10nF 20% X7R 50V |
| 2200 | | 4822 122 32646 | 5.6nF 10%X 7R 50V |
| ▲ 2203 | | | |
| \| | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2205 | | | |
| 2206 | | 4822 122 32627 | 2.7nF 10% X7R 50V |
| 2207 | | 5322 126 10465 | 3.9nF 10% X7R 63V |
| 2208 | | 5322 116 80853 | 560pF 5% NP 63V |
| ▲ 2209 | | 5322 122 34123 | 1nF 10% X7R 50V |
| ▲ 2210 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2211 | | 4822 124 80483 | 47uF 20% 6.3V |
| 2212 | | 5322 122 32481 | 15pF 5% 50V |
| 2213 | | 5322 122 32481 | 15pF 5% 50V |
| 2214 | | 5322 122 32452 | 47pF 5% NP 63V |
| ▲ 2215 | | 4822 122 33177 | 10nF 20% X7R 50V |
| ▲ 2216 | | 4822 122 33177 | 10nF 20% X7R 50V |
| ▲ 2217 | | | |
| \| | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2222 | | | |
| 2223 | | 4822 124 80483 | 47uF 20% 6.3V |
| 2224 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2225 | | 5322 122 32448 | 10pF 5% 50V |
| 2226 | | 5322 122 32448 | 10pF 5% 50V |
| ▲ 2228 | | 4822 122 33342 | 33nF 10% X7R 50V |
| ▲ 2229 | | 4822 122 33177 | 10nF 20% X7R 50V |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| ▲ 2230 | | 5322 122 32654 | 22Nf 10% X7R 63V |
| ▲ 2231 | | 5322 122 32654 | 22Nf 10% X7R 63V |
| 2232 | | | |
| \| | | 4822 126 13618 | 330Pf 1% NPO 63V |
| 2234 | | | |
| ▲ 2235 | | 5322 122 32654 | 22Nf 10% X7R 63V |
| 2236 | | | |
| \| | | 4822 126 13618 | 330Pf 1% NPO 63V |
| 2239 | | | |
| ▲ 2240 | | 5322 122 32654 | 22Nf 10% X7R 63V |
| 2241 | | 4822 126 13618 | 330Pf 1% NPO 63V |
| ▲ 2242 | | 5322 122 32654 | 22Nf 10% X7R 63V |
| ▲ 2245 | | 5322 122 32654 | 22Nf 10% X7R 63V |
| 2246 | | 4822 122 33496 | 100Nf 10% X7R 63V |
| 2247 | | 4822 124 80483 | 47Uf 20% 6.3V |
| ▲ 2255 | | 5322 122 32654 | 22Nf 10% X7R 63V |
| ▲ 2256 | | 5322 122 32654 | 22Nf 10% X7R 63V |
| 2258 | | 5322 122 32659 | 33Pf 5% 50V |
| 2259 | | 5322 122 32659 | 33Pf 5% 50V |
| 2262 | | 5322 122 32659 | 33Pf 5% 50V |
| 2267 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2268 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ▲ 2270 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2275 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2276 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2280 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2281 | | 5322 122 32658 | 22pF 5% 50V |
| ▲ 2282 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2283 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ▲ 2284 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2285 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2286 | | 5322 122 32658 | 22pF 5% 50V |
| 2287 | | 5322 122 32658 | 22pF 5% 50V |
| 2288 | | 4822 122 31981 | 33nF +-0.5pF 50V |
| 2292 | | 4822 122 31981 | 33nF +-0.5pF 50V |
| 2296 | | 4822 122 31981 | 33nF +-0.5pF 50V |
| 2297 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2330 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ▲ 2337 | | 5322 122 34123 | 1nF 10% X7R 50V |
| ▲ 2375 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2380 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2385 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ▲ 2390 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2400 | | | |
| \| | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2404 | | | |
| 2406 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ▲ 2407 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ▲ 2409 | | 5322 122 32654 | 22nF 10% X7R 63V |
| 2411 | | | |
| \| | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2414 | | | |
| 2416 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2417 | | 4822 122 32646 | 5.6nF 10% X7R 50V |
| 2419 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2425 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2430 | | 4822 122 33496 | 100nF 10% X7R 63V |

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| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 2435 | | 4822 122 33496 | 100nF 10% X7R 63V |
| 2436 | | 5322 122 32531 | 100pF 5% NP 50V |
| ⚠ 2440 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ⚠ 2445 | | | |
| \| | | 5322 122 32654 | 22nF 10% X7R 63V |
| ⚠ 2448 | | | |
| 2450 | | 4822 122 33496 | 100nF 10% X7R 63V |
| ⚠ 2460 | | 5322 122 32654 | 22nF 10% X7R 63V |
| ⚠ 2555 | | | |
| \| | | 5322 122 32654 | 22nF 10% X7R 63V |
| ⚠ 2560 | | | |
| 2564 | | 4822 124 41527 | 47uF 25V |
| 2565 | | 4822 124 41527 | 47uF 25V |
| ⚠ 2580 | | 5322 122 32654 | 22nF 10% X7R 63V |
| | | | **RESISTORS** |
| 3009 | | 4822 117 10833 | 10K 1% 0.1W |
| 3010 | | 4822 051 20101 | 100R 5% 0.1W |
| 3011 | | 4822 051 20392 | 3K9 5% 0.1W |
| 3012 | | 4822 051 20471 | 470R 5% 0.1W |
| 3015 | | 4822 051 10102 | 1K 2% 0.25W |
| 3016 | | 4822 051 10102 | 1K 2% 0.25W |
| ⚠ 3017 | | 4822 117 11151 | 1R 5% |
| ⚠ 3108 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3109 | | 4822 051 20473 | 47K 5% 0.1W |
| 3110 | | 4822 051 20101 | 100R 5% 0.1W |
| 3111 | | 4822 051 20184 | 180K 5% 0.1W |
| 3112 | | 4822 051 20474 | 470K 5% 0.1W |
| 3120 | | 4822 051 20273 | 27K 5% 0.1W |
| 3121 | | 4822 051 20474 | 470K 5% 0.1W |
| 3122 | | 4822 051 20223 | 22K 5% 0.1W |
| 3123 | | 4822 051 20223 | 22K 5% 0.1W |
| 3124 | | 4822 051 20333 | 33K 5% 0.1W |
| 3133 | | 4822 051 20105 | 1M 5% 0.1W |
| 3134 | | 4822 051 20333 | 33K 5% 0.1W |
| 3135 | | 4822 117 10833 | 10K 1% 0.1W |
| 3136 | | 4822 117 10833 | 10K 1% 0.1W |
| 3137 | | 4822 051 20153 | 15K 5% 0.1W |
| 3138 | | 4822 117 10833 | 10K 1% 0.1W |
| 3139 | | 4822 051 20752 | 7K5 5% 0.1W |
| 3140 | | 4822 051 20154 | 150K 5% 0.1W |
| 3142 | | 4822 051 20273 | 27K 5% 0.1W |
| 3143 | | 4822 051 20105 | 1M 5% 0.1W |
| 3144 | | 4822 117 10833 | 10K 1% 0.1W |
| 3147 | | 4822 051 10102 | 1K 2% 0.25W |
| 3148 | | 4822 051 20474 | 470K 5% 0.1W |
| 3149 | | 4822 117 10833 | 10K 1% 0.1W |
| 3150 | | 4822 117 10833 | 10K 1% 0.1W |
| 3151 | | 4822 051 20104 | 100K 5% 0.1W |
| 3152 | | 4822 051 20104 | 100K 5% 0.1W |
| 3153 | | 4822 051 10102 | 1K 2% 0.25W |
| 3154 | | 4822 051 10102 | 1K 2% 0.25W |
| 3155 | | 4822 051 20105 | 1M 5% 0.1W |
| 3156 | | | |
| \| | | 4822 051 20101 | 100R 5% 0.1W |
| 3158 | | | |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 3160 | | 4822 051 20223 | 22K 5% 0.1W |
| 3161 | | 4822 051 20105 | 1M 5% 0.1W |
| 3162 | | 4822 051 20105 | 1M 5% 0.1W |
| 3164 | | 4822 051 20223 | 22K 5% 0.1W |
| 3165 | | 4822 051 20101 | 100R 5% 0.1W |
| 3168 | | 4822 051 20101 | 100R 5% 0.1W |
| 3169 | | 4822 051 20101 | 100R 5% 0.1W |
| 3171 | | 4822 117 11449 | 2K2 1% 0.1W |
| 3172 | | 4822 051 20105 | 1M 5% 0.1W |
| 3173 | | | |
| \| | | 4822 051 20101 | 100R 5% 0.1W |
| 3177 | | | |
| 3178 | | 4822 051 20223 | 22K 5% 0.1W |
| 3179 | | 4822 051 20101 | 100R 5% 0.1W |
| 3180 | | 4822 117 10833 | 10K 1% 0.1W |
| 3181 | | 4822 051 20562 | 5K6 5% 0.1W |
| 3182 | | 4822 051 20562 | 5K6 5% 0.1W |
| ⚠ 3183 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3184 | | 4822 051 20101 | 100R 5% 0.1W |
| 3185 | | 4822 051 20101 | 100R 5% 0.1W |
| 3190 | | 4822 117 10833 | 10K 1% 0.1W |
| 3191 | | 4822 051 20562 | 5K6 5% 0.1W |
| 3192 | | 4822 051 20562 | 5K6 5% 0.1W |
| ⚠ 3193 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3194 | | 4822 051 20101 | 100R 5% 0.1W |
| 3195 | | 4822 051 20101 | 100R 5% 0.1W |
| ⚠ 3196 | | 5322 117 11726 | 10R 5% |
| 3200 | | 4822 051 20391 | 390R 5% 0.1W |
| 3201 | | 4822 051 20223 | 22K 5% 0.1W |
| 3202 | | 4822 051 20393 | 39K 5% 0.1W |
| ⚠ 3203 | | 4822 051 20109 | 10R 5% 0.1W |
| 3204 | | 4822 051 20821 | 820R 5% 0.1W |
| 3205 | | 4822 051 20391 | 390R 5% 0.1W |
| 3206 | | 4822 117 10833 | 10K 1% 0.1W |
| 3207 | | 4822 117 10833 | 10K 1% 0.1W |
| 3208 | | 4822 117 11503 | 220R 1% 0.1W |
| 3209 | | 4822 051 20223 | 22K 5% 0.1W |
| 3210 | | 4822 051 20393 | 39K 5% 0.1W |
| ⚠ 3211 | | 4822 051 20109 | 10R 5% 0.1W |
| 3212 | | 4822 051 20821 | 820R 5% 0.1W |
| ⚠ 3213 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3214 | | 4822 051 20105 | 1M 5% 0.1W |
| 3215 | | 4822 117 10833 | 10K 1% 0.1W |
| 3216 | | | |
| \| | | 4822 051 20101 | 100R 5% 0.1W |
| 3220 | | | |
| ⚠ 3221 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3222 | | 4822 051 20101 | 100R 5% 0.1W |
| 3228 | | 4822 117 10833 | 10K 1% 0.1W |
| 3229 | | 4822 117 10833 | 10K 1% 0.1W |
| ⚠ 3230 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3231 | | 4822 117 11751 | 16K RC12H 1% 0805 |
| 3232 | | 4822 117 11145 | 4K7 1% 0.1W |
| 3233 | | 4822 117 10839 | 130K 1% 0.1W |
| 3235 | | 4822 117 11751 | 16K RC12H 1% 0805 |
| 3236 | | 4822 117 11145 | 4K7 1% 0.1W |
| 3237 | | 4822 117 10833 | 10K 1% 0.1W |

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 3238 | | 4822 117 10833 | 10K 1% 0.1W |
| 3239 | | 4822 117 10839 | 130K 1% 0.1W |
| 3240 | | 4822 117 10839 | 130K 1% 0.1W |
| ⚠ 3241 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3242 | | 4822 051 20105 | 1M 5% 0.1W |
| 3243 | | 4822 051 20564 | 560K 5% 0.1W |
| 3244 | | 4822 117 11449 | 2K2 1% 0.1W |
| 3245 | | 4822 051 20223 | 22K 5% 0.1W |
| 3246 | | 4822 051 20394 | 390K 5% 0.1W |
| 3247 | | 4822 117 11503 | 220R 1% 0.1W |
| 3248 | | 4822 051 20223 | 22K 5% 0.1W |
| 3249 | | 4822 051 20223 | 22K 5% 0.1W |
| 3250 | | 4822 051 20101 | 100R 5% 0.1W |
| 3251 | | | |
| \| | | 4822 051 20223 | 22K 5% 0.1W |
| 3253 | | | |
| ⚠ 3254 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3255 | | 4822 051 20223 | 22K 5% 0.1W |
| 3256 | | 4822 051 20223 | 22K 5% 0.1W |
| 3257 | | 4822 051 20101 | 100R 5% 0.1W |
| 3258 | | 4822 051 20101 | 100R 5% 0.1W |
| 3259 | | 4822 117 10833 | 10K 1% 0.1W |
| 3260 | | 4822 117 11139 | 1K5 1% 0.1W |
| 3261 | | 4822 117 11449 | 2K2 1% 0.1W |
| 3262 | | 4822 051 20101 | 100R 5% 0.1W |
| 3263 | | 4822 051 20473 | 47K 5% 0.1W |
| 3264 | | | |
| \| | | 4822 051 10102 | 1K 2% 0.25W |
| 3266 | | | |
| 3267 | | 4822 117 10833 | 10K 1% 0.1W |
| 3268 | | 4822 051 20392 | 3K9 5% 0.1W |
| 3269 | | 4822 051 10102 | 1K 2% 0.25W |
| 3270 | | | |
| \| | | 4822 117 10833 | 10K 1% 0.1W |
| 3272 | | | |
| 3273 | | 4822 051 10102 | 1K 2% 0.25W |
| 3274 | | 4822 051 20183 | 18K 5% 0.1W |
| 3275 | | | |
| \| | | 4822 051 20223 | 22K 5% 0.1W |
| 3277 | | | |
| 3279 | | | |
| \| | | 4822 051 10102 | 1K 2% 0.25W |
| 3283 | | | |
| 3284 | | 4822 051 10479 | 47R 2% 0.25W |
| 3285 | | 4822 051 20562 | 5K6 5% 0.1W |
| 3286 | | 4822 051 20562 | 5K6 5% 0.1W |
| 3287 | | 4822 051 10102 | 1K 2% 0.25W |
| 3288 | | 4822 051 10102 | 1K 2% 0.25W |
| 3289 | | 4822 051 10479 | 47R 2% 0.25W |
| 3290 | | 4822 051 20562 | 5K6 5% 0.1W |
| 3291 | | 4822 051 20562 | 5K6 5% 0.1W |
| 3292 | | 4822 051 10102 | 1K 2% 0.25W |
| 3293 | | 4822 051 10102 | 1K 2% 0.25W |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 3294 | | 4822 051 10479 | 47R 2% 0.25W |
| 3295 | | 4822 051 20562 | 5K6 5% 0.1W |
| 3296 | | 4822 051 20562 | 5K6 5% 0.1W |
| 3297 | | 4822 117 11503 | 220R 1% 0.1W |
| 3298 | | 4822 117 11503 | 220R 1% 0.1W |
| ⚠ 3310 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3311 | | 4822 117 10833 | 10K 1% 0.1W |
| 3312 | | 4822 117 11503 | 220R 1% 0.1W |
| ⚠ 3315 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3316 | | 4822 117 10833 | 10K 1% 0.1W |
| 3317 | | 4822 117 11503 | 220R 1% 0.1W |
| ⚠ 3320 | | 4822 051 20472 | 4K7 5% 0.1W |
| 3321 | | 4822 117 10833 | 10K 1% 0.1W |
| 3322 | | 4822 117 11503 | 220R 1% 0.1W |
| 3330 | | | |
| \| | | 4822 117 10833 | 10K 1% 0.1W |
| 3342 | | | |
| 3343 | | 4822 051 20105 | 1M 5% 0.1W |
| 3344 | | 4822 051 20101 | 100R 5% 0.1W |
| 3345 | | 4822 051 20101 | 100R 5% 0.1W |
| 3346 | | | |
| \| | | 4822 117 10833 | 10K 1% 0.1W |
| 3349 | | | |
| 3351 | | | |
| \| | | 4822 117 10833 | 10K 1% 0.1W |
| 3353 | | | |
| 3356 | | | |
| \| | | 4822 117 10833 | 10K 1% 0.1W |
| 3358 | | | |
| 3360 | | | |
| \| | | 4822 117 10833 | 10K 1% 0.1W |
| 3372 | | | |
| 3390 | | 4822 117 10833 | 10K 1% 0.1W |
| ⚠ 3397 | | 4822 051 20008 | 0R (0805) |
| ⚠ 3398 | | 4822 051 20472 | 4K7 5% 0.1W **(CDR620)** |
| 3398 | | 4822 117 10833 | 10K 1% 0.1W **(CDR615)** |
| 3403 | | 4822 117 10833 | 10K 1% 0.1W |
| 3406 | | 4822 051 20104 | 100K 5% 0.1W |
| 3411 | | 4822 117 10833 | 10K 1% 0.1W |
| 3415 | | | |
| \| | | 4822 117 10833 | 10K 1% 0.1W |
| 3417 | | | |
| ⚠ 3418 | | 4822 051 20008 | 0R (0805) |
| 3422 | | 4822 117 11449 | 2K2 1% 0.1W |
| 3423 | | | |
| \| | | 4822 117 10833 | 10K 1% 0.1W |
| 3426 | | | |
| 3556 | | 4822 051 20223 | 22K 5% 0.1W |
| 3565 | | 4822 116 40272 | PTC SM 302 15V 0R25 |
| 3582 | | 4822 117 10833 | 10K 1% 0.1W |
| ⚠ 3900 | | | |
| \| | | 4822 051 20008 | 0R (0805) |
| ⚠ 3904 | | | |
| ⚠ 3905 | | 4822 051 10008 | 0R 5% 0.25W |

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

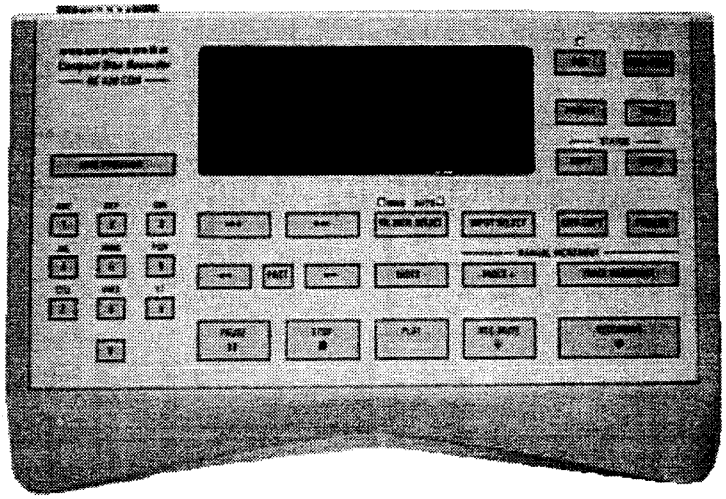
| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| ⚠ 3906 | | 4822 051 10008 | 0R 5% 0.25W |
| ⚠ 3908 | | 4822 051 20008 | 0R (0805) |
| ⚠ 3910 | | 4822 051 20008 | 0R (0805) |
| ⚠ 3920 | | 4822 051 20008 | 0R (0805) |
| ⚠ 3946 | | 4822 051 20008 | 0R (0805) |
| ⚠ 3964 | | 4822 051 20008 | 0R (0805) |
| ⚠ 3971 | | 4822 051 20008 | 0R (0805) |
| ⚠ 3983 | | 4822 051 20008 | 0R (0805) |
| | | | **SEMICONDUCTORS** |
| 6005 | | 4822 130 81512 | BZV55-C6V2 |
| 6006 | | 4822 130 81222 | BZV55-C15 |
| ⚠ 6012 | | 5322 130 31928 | BAS16 |
| 6013 | | 5322 130 32076 | BAT18 |
| 6014 | | 4822 130 33996 | BZX84-C9V1 |
| 6016 | | 4822 130 83916 | MBRS140T3 |
| 6120 | | 4822 130 80622 | BAT54 |
| 6140 | | 5322 130 80214 | BAS28 |
| 6155 | | 4822 130 80622 | BAT54 |
| 6185 | | 5322 130 80214 | BAS28 |
| 6285 | | 5322 130 80214 | BAS28 |
| 6290 | | 5322 130 80214 | BAS28 |
| 6295 | | 5322 130 80214 | BAS28 |
| 6312 | | 4822 130 83915 | TLMV3100 |
| 6317 | | 4822 130 83917 | TLMO3100 |
| 6410 | | 5322 130 80214 | BAS28 |
| ⚠ 6425 | | 5322 130 31928 | BAS16 |
| 6565 | | 4822 130 83916 | MBRS140T3 **(CDR620 ONLY)** |
| 7010 | | 4822 130 60142 | BC869 |
| ⚠ 7012 | | 5322 130 41982 | BC848B (UAW) |
| ⚠ 7015 | | 5322 130 41982 | BC848B (UAW) |
| 7105 | | 4822 209 33419 | OQ8844T/K2 |
| 7120 | | 5322 130 44787 | BFR31 |
| 7121 | | 5322 130 41983 | BC858B (UAW) |
| 7130 | | 4822 209 33421 | OQ8845T/K3 |
| 7150 | | 4822 209 30732 | LM319D |
| 7155 | | 5322 209 71553 | NE532D |
| 7170 | | 4822 209 52723 | UPD784025GC-108 |
| 7182 | | 5322 130 41983 | BC858B (UAW) |
| 7183 | | 4822 130 60142 | BC869 |
| 7185 | | 5322 130 61569 | BC868 |
| 7192 | | 5322 130 41983 | BC858B (UAW) |
| 7193 | | 4822 130 60142 | BC869 |
| 7195 | | 5322 130 61569 | BC868 |
| ⚠ 7200 | | 5322 130 41982 | BC848B (UAW) |
| 7205 | | 4822 209 60792 | 74HC4053D |
| ⚠ 7206 | | 5322 130 41982 | BC848B (UAW) |
| ⚠ 7209 | | 5322 130 41982 | BC848B (UAW) |
| 7210 | | 4822 209 90073 | GXCT38307CB16 |
| 7230 | | 5322 209 61482 | 74HC4066D |
| 7235 | | 4822 209 30095 | LM833D |
| 7245 | | 4822 209 33417 | TDA1371H/N1 |
| 7270 | | 4822 209 31615 | LM324AD |
| ⚠ 7271 | | 5322 130 41982 | BC848B (UAW) |
| 7272 | | 5322 130 41983 | BC858B (UAW) |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 7275 | | 4822 900 10976 | CV4557A28 |
| 7280 | | 4822 209 60792 | 74HC4053D |
| 7282 | | 4822 209 31615 | LM324AD |
| 7285 | | 5322 209 61482 | 74HC4066D |
| ⚠ 7286 | | 5322 130 41982 | BC848B (UAW) |
| 7287 | | 5322 130 41983 | BC858B (UAW) |
| 7288 | | 4822 130 60142 | BC869 |
| 7289 | | 5322 130 61569 | BC868 |
| ⚠ 7290 | | 5322 130 41982 | BC848B (UAW) |
| 7291 | | 5322 130 41983 | BC858B (UAW) |
| 7292 | | 4822 130 60142 | BC869 |
| 7293 | | 5322 130 61569 | BC868 |
| ⚠ 7294 | | 5322 130 41982 | BC848B (UAW) |
| 7295 | | 5322 130 41983 | BC858B (UAW) |
| 7296 | | 4822 130 60142 | BC869 |
| 7297 | | 5322 130 61569 | BC868 |
| 7305 | | 4822 209 31275 | MC34064D-5 |
| 7310 | | 5322 130 41983 | BC858B (UAW) |
| 7315 | | 5322 130 41983 | BC858B (UAW) |
| 7320 | | 5322 130 41983 | BC858B (UAW) |
| 7330 | | 4822 209 52725 | MC68HC11F1- |
| 7375 | | 4822 209 33429 | MC74ACT00D |
| 7380 | | 4822 900 10973 | AM27C040-120JC |
| 7385 | | 4822 209 12712 | KM6264BLG-7 |
| 7390 | | 4822 209 33429 | MC74ACT00D |
| 7400 | | 4822 209 52721 | XILINX |
| 7403 | | 4822 209 60792 | 74HC4053D |
| ⚠ 7404 | | 5322 130 41982 | BC848B (UAW) |
| 7407 | | 4822 209 33434 | MC74F379D |
| 7409 | | 4822 209 60792 | 74HC4053D |
| 7410 | | 4822 209 52726 | DSP56004FJ40 |
| 7430 | | 4822 209 52724 | UPD424400- |
| 7435 | | 4822 209 52724 | UPD424400- |
| 7440 | | 5322 209 31276 | 74HCT573D |
| 7445 | | 4822 209 33425 | CDB2 |
| 7450 | | 4822 209 12712 | KM6264BLG-7 |
| 7460 | | 4822 209 33291 | MC74AC14DR2 |
| 7555 | | 4822 209 52727 | SYM53CF92 |
| 7565 | | 4822 209 90333 | MC34268DT **(CDR615 ONLY)** |
| 7585 | | 4822 209 13644 | UC5608 |

# Service Manual

**RC620**

**Remote Control**



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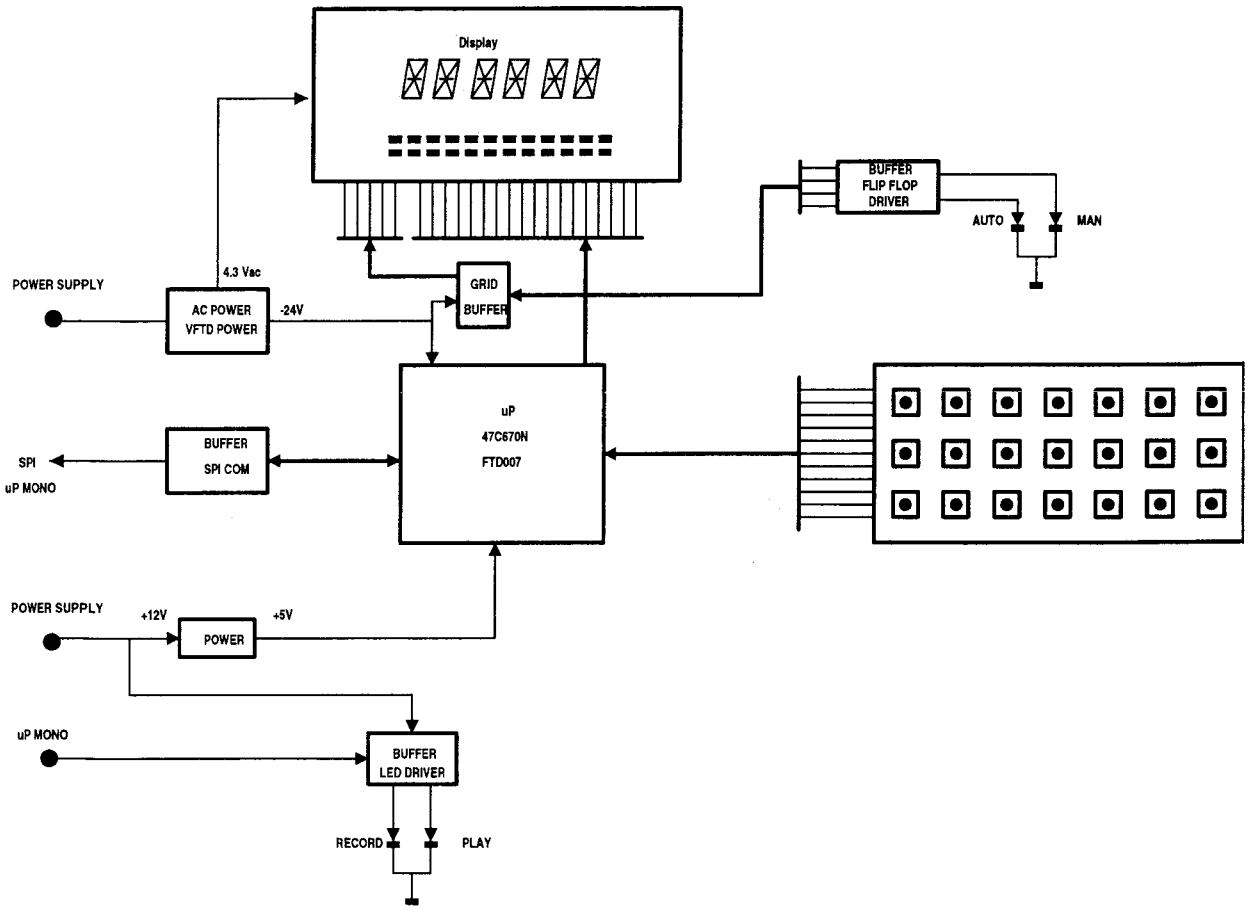
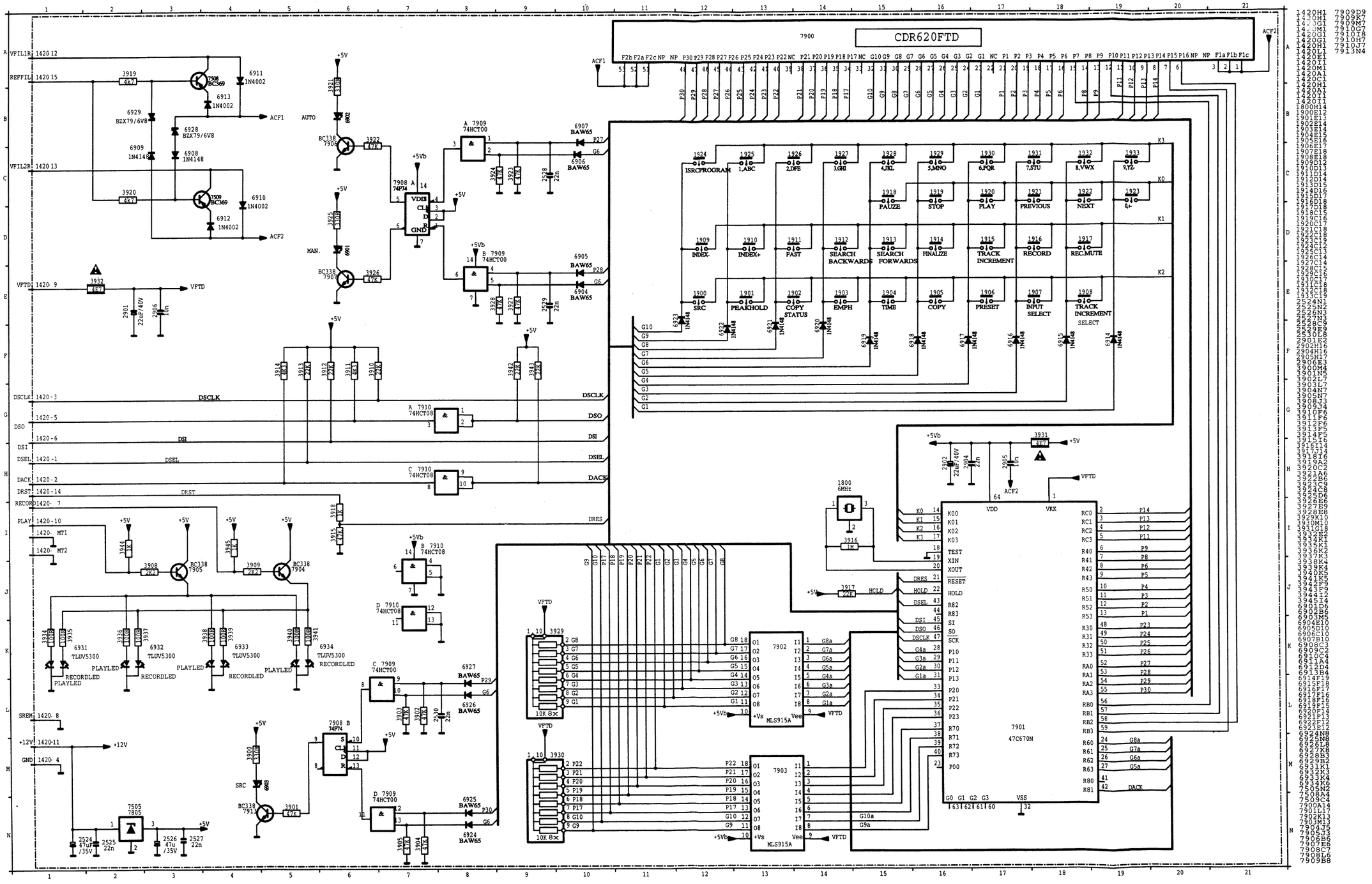
**model RC620**

## 3.1 BLOCK DIAGRAM

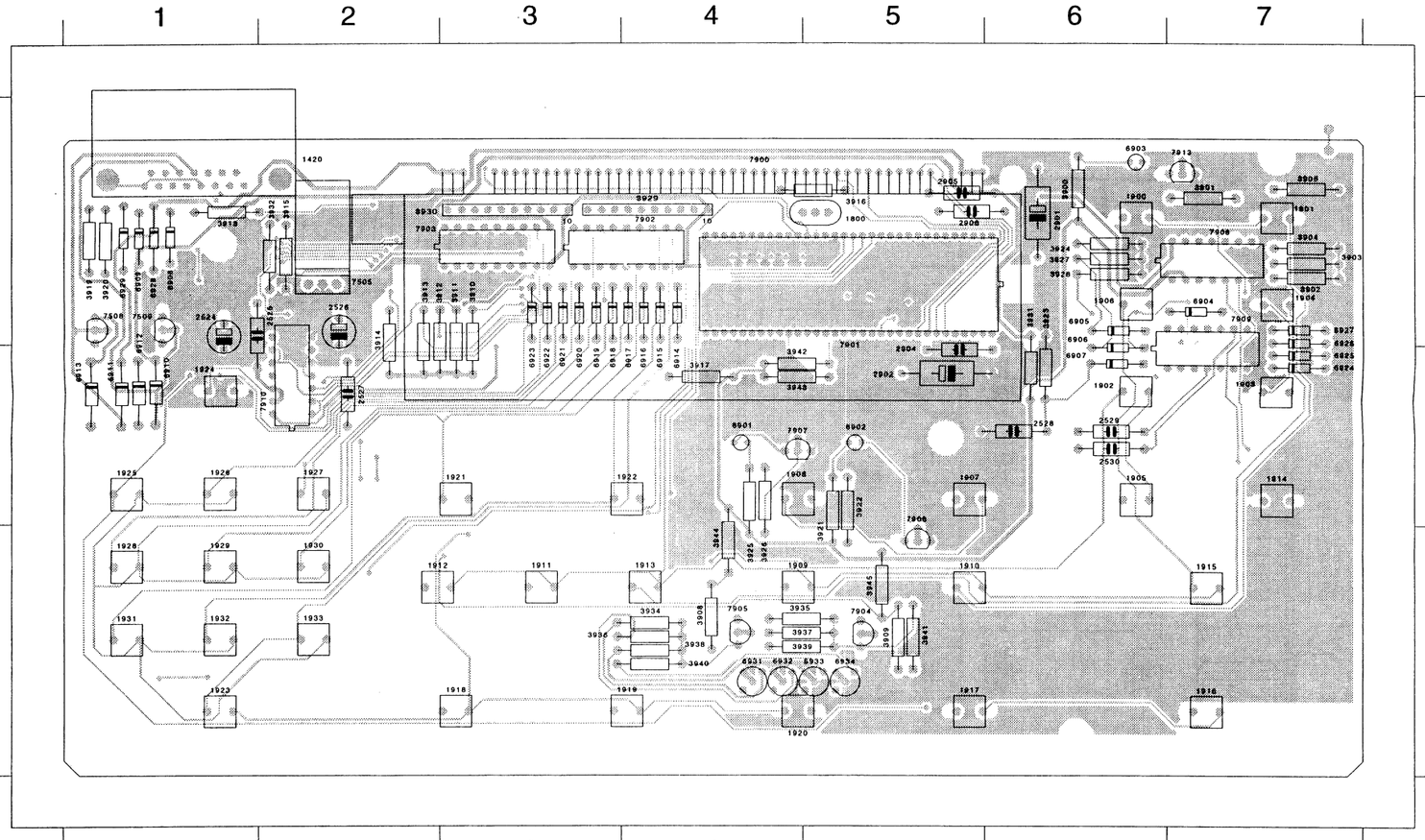


## 3.2 SCHEMATIC DIAGRAM AND PARTS LOCATION



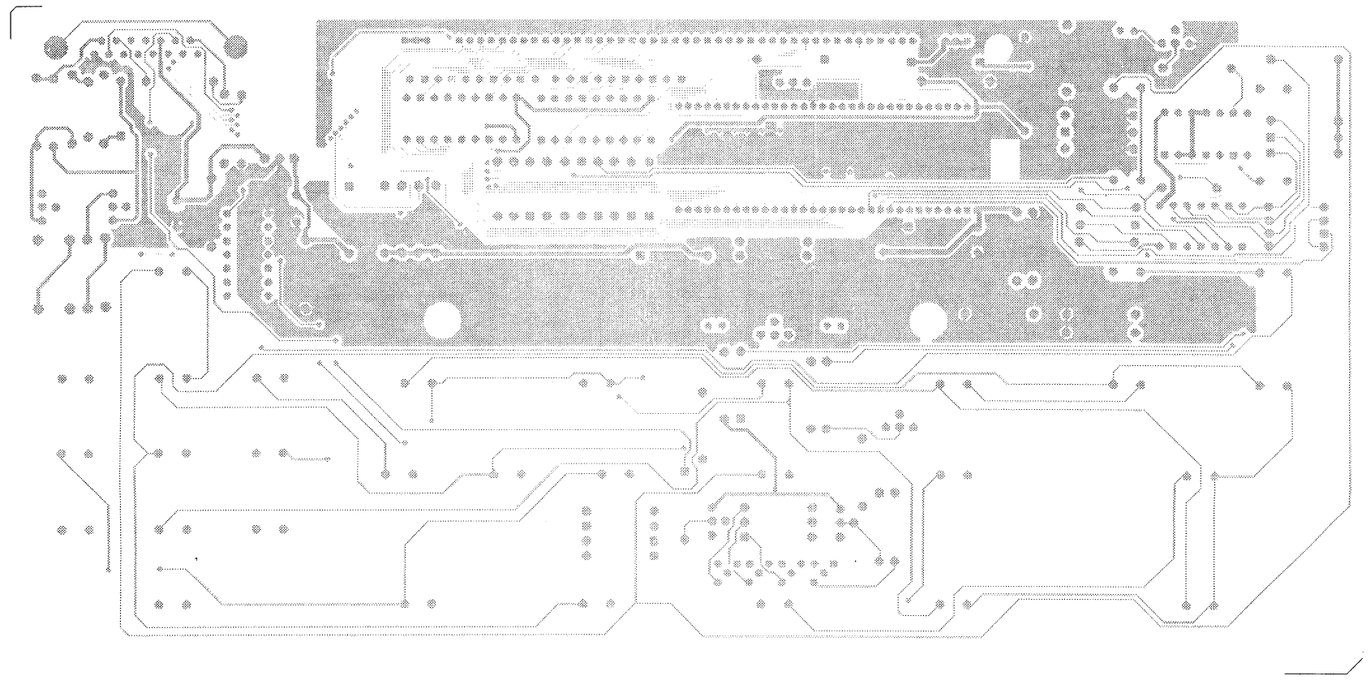
## COMPONENT SIDE

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1420 A 1 | 1905 B 6 | 1912 C 2 | 1919 C 4 | 1926 B 1 | 1933 C 2 | 2530 B 6 | 3901 A 7 | 3910 A 3 | 3917 B 4 | 3924 A 6 | 3931 B 6 | 3939 C 4 | 6901 B 4 | 6908 A 1 | 6915 A 4 | 6922 A 3 | 6929 A 1 | 7509 A 1 | 7906 C 5 |
| 1800 A 5 | 1906 A 6 | 1913 C 4 | 1920 C 4 | 1927 B 2 | 2524 A 1 | 2901 A 6 | 3902 A 7 | 3911 A 3 | 3918 A 1 | 3925 B 4 | 3932 A 2 | 3940 C 4 | 6902 B 5 | 6909 A 1 | 6916 A 4 | 6923 A 3 | 6931 C 4 | 7900 A 4 | 7907 B 4 |
| 1900 A 6 | 1907 B 5 | 1914 B 7 | 1921 B 3 | 1928 C 1 | 2525 A 1 | 2902 B 5 | 3903 A 7 | 3912 A 2 | 3919 A 1 | 3926 B 4 | 3934 C 4 | 3941 C 5 | 6903 A 6 | 6910 B 1 | 6917 A 4 | 6924 B 7 | 6932 C 5 | 7901 A 5 | 7908 A 7 |
| 1901 A 7 | 1908 B 4 | 1915 C 7 | 1922 B 4 | 1929 C 1 | 2526 A 2 | 2904 B 5 | 3904 A 7 | 3913 A 2 | 3920 A 1 | 3927 A 6 | 3935 C 4 | 3942 B 4 | 6904 A 7 | 6911 B 1 | 6918 A 3 | 6925 B 7 | 6933 C 5 | 7902 A 4 | 7909 B 7 |
| 1902 B 6 | 1909 C 4 | 1916 C 7 | 1923 C 1 | 1930 C 2 | 2527 B 2 | 2905 A 5 | 3905 A 7 | 3914 A 2 | 3921 B 5 | 3928 A 6 | 3936 C 4 | 3943 B 4 | 6905 A 6 | 6912 B 1 | 6919 A 3 | 6926 A 7 | 6934 C 5 | 7903 A 3 | 7910 B 2 |
| 1903 B 7 | 1910 C 5 | 1917 C 5 | 1924 B 1 | 1931 C 1 | 2528 B 6 | 2906 A 5 | 3908 C 4 | 3915 A 2 | 3922 B 5 | 3929 A 4 | 3937 C 4 | 3944 C 4 | 6906 B 6 | 6913 B 1 | 6920 A 3 | 6927 A 7 | 7505 A 2 | 7904 C 5 | 7913 A 7 |
| 1904 A 7 | 1911 C 3 | 1918 C 3 | 1925 B 1 | 1932 C 1 | 2529 B 6 | 3900 A 6 | 3909 C 5 | 3916 A 5 | 3923 B 6 | 3930 A 3 | 3938 C 4 | 3945 C 5 | 6907 B 6 | 6914 A 4 | 6921 A 3 | 6928 A 1 | 7508 A 1 | 7905 C 4 | |





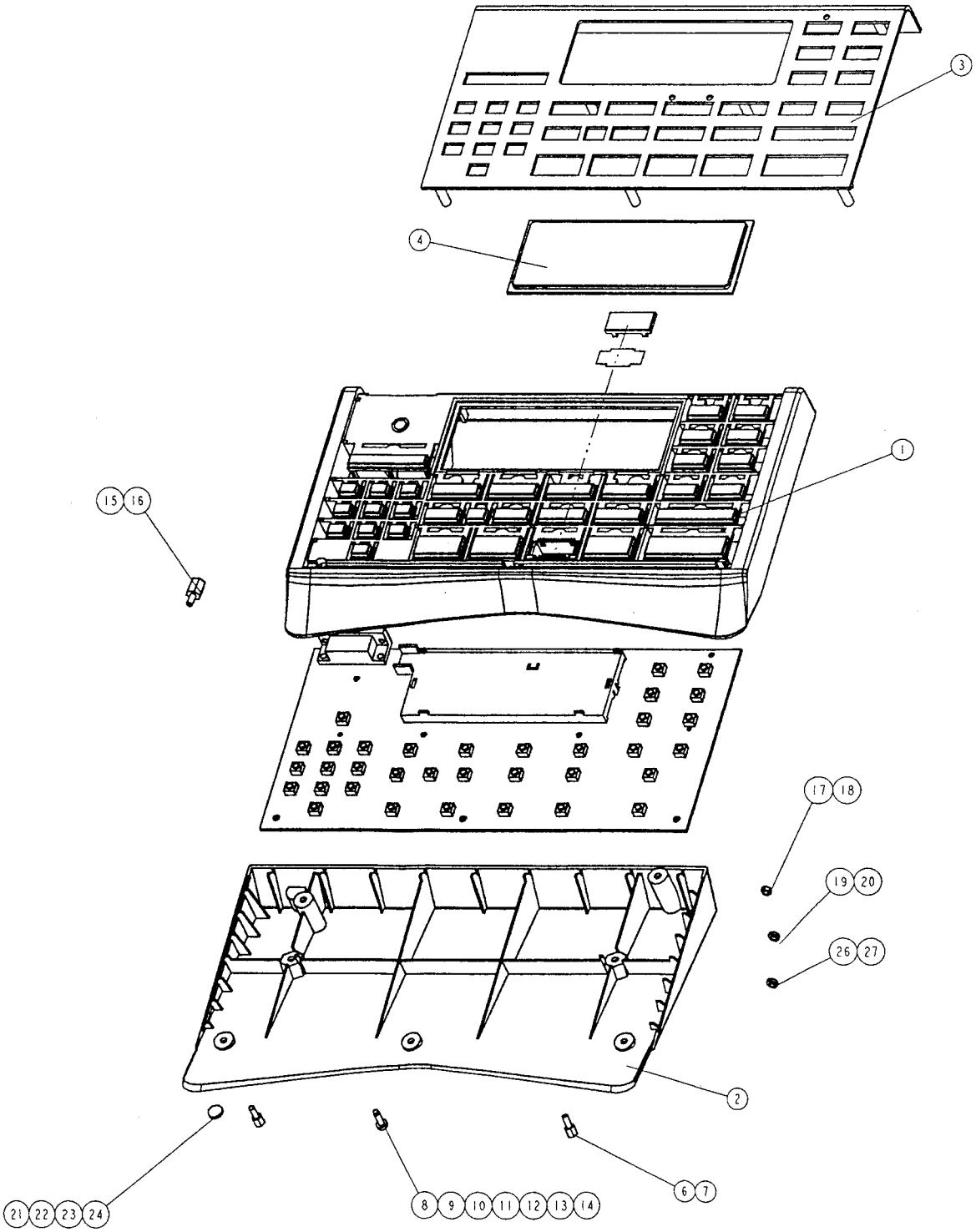

## SOLDER SIDE



## 3.3 EXPLODED VIEWS AND PARTS LIST

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| 1 | /09B | 4822 459 04017 | FRONT BLACK |
| 1 | /09M | 4822 459 04102 | FRONT GREY |
| 3 | /09B | 4822 459 04018 | FRONT ALU BLACK |
| 3 | /09M | 4822 459 04103 | FRONT ALU GRAY |
| 4 | | 4822 450 10054 | WINDOW |
| 17 | | 4822 505 10743 | M 3 HEXLOCKPASTZNBU |
| 18 | | 4822 505 10743 | M 3 HEXLOCKPASTZNBU |
| 315 | | 4822 320 11159 | FLEX 15P CONNECTOR (IVOLY) |



## 3.4 ELECTRICAL PARTS LIST

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, **:EUROPE)

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| | | | **MISCELLANEOUS** |
| 1800 | | 4822 242 81002 | CST6.00MGW-TF01 |
| 1900 | | | |
| \| | | 4822 276 13114 | TACT SWITCH |
| 1933 | | | |
| 7900 | | 4822 135 00002 | BJ379GK (DISPLAY) |
| | | | **CAPACITORS** |
| 2524 | | 4822 124 41527 | 47uF 25V |
| ⚠ 2525 | | 5322 126 13187 | 22nF 100V |
| 2526 | | 4822 124 41527 | 47uF 25V |
| ⚠ 2527 | | | |
| \| | | 5322 126 13187 | 22nF 100V |
| ⚠ 2530 | | | |
| 2901 | | 5322 124 21643 | 22uF 20% 40V |
| 2902 | | 5322 124 21643 | 22uF 20% 40V |
| ⚠ 2904 | | 5322 126 13187 | 22nF 100V |
| 2905 | | 4822 122 10177 | 10nF 20% 25V |
| 2906 | | 4822 122 10177 | 10nF 20% 25V |
| | | | **RESISTORS** |
| ⚠ 3900 | | 4822 050 23301 | 330R 1% 0.6W |
| ⚠ 3901 | | | |
| \| | | 4822 050 24703 | 47K 1% 0.6W |
| ⚠ 3905 | | | |
| 3908 | | 4822 050 22202 | 2K2 1% 0.6W |
| 3909 | | 4822 050 22202 | 2K2 1% 0.6W |
| 3910 | | 4822 116 52235 | 1M 5% 0.5W |
| 3911 | | 4822 050 24302 | 4K3 1% 0.6W |
| 3912 | | 4822 050 22203 | 22K 1% 0.6W |
| 3913 | | 4822 050 22203 | 22K 1% 0.6W |
| 3914 | | 4822 050 24302 | 4K3 1% 0.6W |
| ⚠ 3915 | | 4822 050 24703 | 47K 1% 0.6W |
| 3916 | | 4822 116 52235 | 1M 5% 0.5W |
| 3917 | | 4822 050 22203 | 22K 1% 0.6W |
| ⚠ 3918 | | 4822 050 21002 | 1K 1% 0.6W |
| 3919 | | 4822 050 24702 | 4K7 1% 0.6W |
| 3920 | | 4822 050 24702 | 4K7 1% 0.6W |
| ⚠ 3921 | | 4822 050 23301 | 330R 1% 0.6W |
| ⚠ 3922 | | | |
| \| | | 4822 050 24703 | 47K 1% 0.6W |
| ⚠ 3924 | | | |
| ⚠ 3925 | | 4822 050 23301 | 330R 1% 0.6W |
| ⚠ 3926 | | | |
| \| | | 4822 050 24703 | 47K 1% 0.6W |
| ⚠ 3928 | | | |
| ⚠ 3929 | | 5322 111 90473 | RES.NETWORK |
| ⚠ 3930 | | 5322 111 90473 | RES.NETWORK |
| ⚠ 3931 | | 4822 052 10478 | 4R7 5% 0.33W |
| ⚠ 3932 | | 4822 052 10478 | 4R7 5% 0.33W |
| ⚠ 3934 | | | |
| \| | | 4822 050 21001 | 100R 1% 0.6W |
| ⚠ 3941 | | | |
| 3942 | | 4822 050 22203 | 22K 1% 0.6W |
| 3943 | | 4822 050 22203 | 22K 1% 0.6W |
| ⚠ 3944 | | 4822 050 21002 | 1K 1% 0.6W |
| ⚠ 3945 | | 4822 050 21002 | 1K 1% 0.6W |

| POS. NO | VERS. COLOR | PART NO. | DESCRIPTION |
|---|---|---|---|
| | | | **SEMICONDUCTORS** |
| 6904 | | | |
| \| | | 4822 130 30613 | BAW62 |
| 6907 | | | |
| ⚠ 6908 | | 4822 130 30621 | 1N4148 (COL) |
| ⚠ 6909 | | 4822 130 30621 | 1N4148 (COL) |
| ⚠ 6910 | | | |
| \| | | 5322 130 30684 | 1N4002GP (UAW) |
| ⚠ 6913 | | | |
| 6914 | | | |
| \| | | 4822 130 30613 | BAW62 |
| 6927 | | | |
| 6928 | | 4822 130 34278 | BZX79-C6V8 (COL) |
| 6929 | | 4822 130 34278 | BZX79-C6V8 (COL) |
| 6901 | | | |
| \| | | 4822 130 10093 | GL3 |
| 6903 | | | |
| 6931 | | | |
| \| | | 4822 130 10052 | GL5ED44 |
| 6934 | | | |
| 7508 | | 5322 130 44593 | BC369 |
| 7509 | | 5322 130 44593 | BC369 |
| ⚠ 7904 | | 4822 130 44196 | BC548C(UAW) |
| ⚠ 7905 | | 4822 130 44196 | BC548C(UAW) |
| 7906 | | 4822 130 44121 | BC338 |
| 7907 | | 4822 130 44121 | BC338 |
| 7913 | | 4822 130 44121 | BC338 |
| ⚠ 7505 | | 4822 209 80817 | L7805CV |
| 7901 | | 4822 209 31251 | TMP47C670P-FTDD007 |
| 7902 | | 4822 209 31623 | MSL915 |
| 7903 | | 4822 209 31623 | MSL915 |
| 7908 | | 5322 209 11109 | 74HCT74N |
| 7909 | | 5322 209 11105 | 74HCT00N |
| 7910 | | 5322 209 11265 | 74HCT08N |